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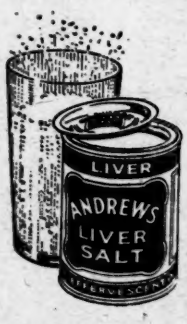

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 31 1942

NUTRITIONAL IRON DEFICIENCY ANAEMIA IN WARTIME*

PART I

THE HAEMOGLOBIN LEVELS OF 831 INFANTS AND CHILDREN

BY

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As we enter the fourth year of the war, with its consequent increased mental and physical strain and inevitable dietary restrictions, the assessment of the health of the nation becomes an urgent necessity. Nutritional deficiencies in a population can be assessed in various ways, the estimation of iron deficiency being one method. The advantage of this method is that iron deficiency can be accurately determined by estimation of haemoglobin concentrations. If such an investigation is made on representative samples of the population in wartime the results can then be compared with similar figures obtained in peacetime, and in this way the effect of war conditions on national health can be demonstrated.

Such an investigation is at present being carried out in Edinburgh on infants, school children, and women of child-bearing age, both pregnant and non-pregnant. The survey covers a representative cross-section of Edinburgh working-class population within these groups. This paper deals only with infants and school children; a second communication will be devoted to the haemoglobin levels in women.

An unselected series of infants and pre-school children from birth to 4 years of age have been examined at the infant clinic attached to the maternity pavilion of the Edinburgh Royal Infirmary, at district welfare clinics, and at wartime nurseries in Edinburgh. The group of school children comprised all the scholars between the ages of 5 and 12 years attending two primary schools which serve working-class districts of Edinburgh. The Haldane haemoglobinometer (13.8 g./100 c.cm. equalling 100%) was employed throughout the investigation. All apparatus used was checked against a standard set.

Infants and Pre-school Children (Birth to 4 Years)

This group comprised 442 individuals: 318 from birth to 23 months, and 124 from 2 to 4 years. None of them had received any iron therapy. A few children between the ages of 9 months and 4 years had been given 25 mg. of vitamin C daily. The results obtained are set out in Tables I and II, and in the accompanying Graph. Of the total number, 142 were examined at "wartime nurseries" which have been set up by the public health authorities to care for children whose mothers are undertaking whole- or part-time war work. Most of these children were supplied with a midday meal in the "nursery."

TABLE I.—*442 Infants and Pre-school Children (Birth to 4 Years). Average Haemoglobin Levels according to Age*

Age	< 1 m.	1 m.	2 m.	3 m.	4 m.	5 m.	6 m.	7 m.	8 m.	9 m.	10 m.	11 m.	12–17 m.	18–25 m.	2 years	3 years	4 years
No. of cases	18	37	42	28	19	15	14	12	13	8	18	11	48	35	29	43	52
Average Hb %	128·3	99	81	76	83	80	79	80	76	77	68·6	72·4	73·9	73	75·3	76·3	76·8

* This subject is still under investigation. Part II, dealing with haemoglobin levels in women, will be published later.

TABLE II.—*236 Infants and Pre-school Children (10 Months to 4 Years). Average Haemoglobin Levels according to Age*

Age	Welfare Clinics		Wartime Nurseries		Combined	
	Cases	Av. Hb %	Cases	Av. Hb %	Cases	Av. Hb %
10 m.	14	69·6	4	65·0	18	68·6
11 m.	7	72·2	4	72·7	11	72·4
12–17 m.	28	77·4	20	69·0	48	73·9
18–23 m.	16	73·0	19	73·3	35	73·1
2 yrs.	11	75·8	18	75·0	29	75·3
3 yrs.	8	76·2	35	76·3	43	76·3
4 yrs.	10	77·5	42	79·5	52	76·8
Totals	94		142		236	

The haemoglobin levels in the two groups in Table II are very similar, except in the age period 12 to 17 months, when the average haemoglobin level of infants examined at welfare clinics is notably higher than those seen at the wartime nurseries. The significance of this is referred to later.

School Children (5 to 12 Years)

This series consisted of 389 children attending two primary day schools in Edinburgh. The results are set forth in Table III in the form of haemoglobin levels at successive ages, and in Table IV as the percentage of children falling into successive haemoglobin ranges. It will be noted that the average haemoglobin level for the whole series, irrespective of age, is 80.3% (Table III), and 53% of the children have less than 80% of haemoglobin (Table IV).

TABLE III.—*389 School Children (5 to 12 Years). Average Haemoglobin Levels according to Age*

Age	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	11 yrs.	12 yrs.	Total
No. of cases	19	39	38	66	75	56	75	21	389
Average Hb %	81·3	80·0	80·4	76·9	80·6	82·2	80·6	81·0	80·3

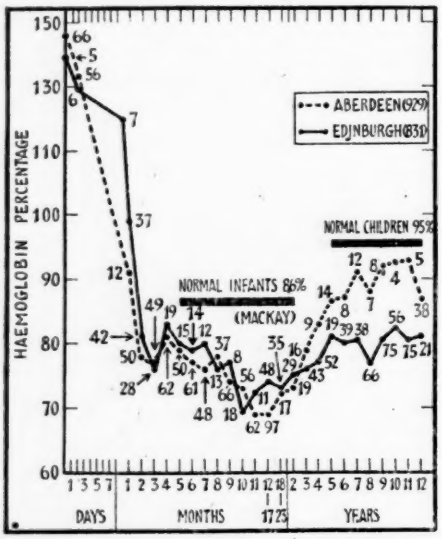
TABLE IV.—*Grades of Anaemia in 389 Edinburgh School Children (5 to 12 Years)*

	No. of Cases	Percentage of Children in Different Haemoglobin Ranges			
		Hb 60–70 %	Hb 71–80 %	Hb 81–90 %	Hb > 90 %
School I	197	9	46	36	9
School II	192	7	44	44	5
Combined	389	8	45	40	7

Discussion

Infants (Birth to 23 Months)

A curve has been constructed from the Edinburgh figures in Table I, and is shown in the graph. On the same graph is drawn the curve which was obtained by Davidson *et al.* (1935) in Aberdeen for children of the same age groups.



Graph showing haemoglobin percentages in the present series compared with those of a similar series investigated in Aberdeen in 1935.

The two curves show a close parallelism from birth up to 10 months, with a slightly higher level throughout in the Edinburgh series. From 4 months onwards there is a gradual fall in haemoglobin levels. This fall becomes more acute in both series from the eighth to the eleventh month. There follows a gradual rise until 2 years of age, which is more rapid in the Edinburgh series. The Edinburgh series therefore shows a slight improvement over the Aberdeen series which may or may not be significant. In addition, after the maximum fall in haemoglobin which occurs between the tenth and eleventh months, an earlier and more marked rise takes place in the Edinburgh group. This improvement could be attributed to the better milk supply for infants due to wartime regulations, or to better attendance at infant welfare clinics for expert advice during the critical period of weaning and the inception of a mixed diet. Although it may be some consolation to know that after three years of war no deterioration in haemoglobin levels of infants has been demonstrated, it should not be forgotten that anaemia in infants is still extremely common.

Table V shows the percentage of infants at different haemoglobin levels (2 to 23 months) in the present Edinburgh series, and the comparable figures for Aberdeen and Edinburgh for the age groups 9 to 23 months. This table indicates that

TABLE V.—*Grades of Anaemia in Infants (2 to 23 Months); Edinburgh, 1942, and Aberdeen, 1935*

Place	Age	No. of Cases	Percentage of Children in Different Haemoglobin Ranges			
			Hb < 61%	Hb 61–70%	Hb 71–80%	Hb > 80%
Edinburgh ..	2–23 m.	262	5	23	42	30
Edinburgh ..	2–8 m.	143	4	15	40	41
Edinburgh ..	9–23 m.	119	5	33	45	17
Aberdeen ..	9–23 m.	298	15	23	49	13

the incidence of severe anaemia (less than 61% haemoglobin) in infants of 9 to 23 months in the 1935 Aberdeen series is three times as great as in the 1942 Edinburgh series, but the percentage of moderately anaemic infants (61% to 70% haemoglobin) has risen by 10% in Edinburgh as compared with the Aberdeen figure. It will be noted that 83% of the Edinburgh infants and 87% of the Aberdeen infants between 9 and 23 months have a haemoglobin level of less than 80%.

A haemoglobin level of 86% ± 5 is widely accepted as the ideal for infants from 2 to 23 months. This figure was suggested by Helen Mackay (1933) from her examination of normal infants whose diets had been supplemented by iron. Haemoglobin levels of 80% or less would by this standard be considered subnormal. On this basis only 17% of the infants from 9 to 23 months in Edinburgh and only 13% of the Aberdeen infants had a normal haemoglobin level.

Mackay's figure of 86% seems to us reasonable, since haemoglobin levels of this magnitude and higher were commonly obtained in one of the Edinburgh clinics, where the mothers were particularly keen and intelligent. The higher average haemoglobin level noted in infants of 12 to 17 months examined at welfare clinics as compared with infants of the same age group in the wartime nurseries (Table II) could be explained on the basis of this observation.

The significance of the frequency with which anaemia is still found in infants cannot be overemphasized. The aetiological importance of low birth weight and infections was stressed by Davidson and Fullerton in 1938. The desirability of augmenting the iron intake at the sixth or seventh month in order to counteract the fall in haemoglobin which occurs when the hepatic stores of iron become exhausted needs special emphasis. At first, when mixed feeding has not been fully established, this may best be done by giving small doses of inorganic iron in an easily assimilated form. Later, when the change to mixed feeding has been completed, this may be best accomplished by increasing the intake of foodstuffs rich in available iron. A careful investigation of this problem by paediatricians is obviously required.

Children of Pre-school Age (2 to 5 Years)

A study of the graph shows that any advantage which the Edinburgh series has over the Aberdeen series in infancy is lost during the pre-school period. Thus on entering school at 5 years the Edinburgh children had an average haemoglobin of 81%, compared with an average figure of 87% for the Aberdeen series.

School Children (5 to 12 Years)

As in the case of the infants, a curve has been constructed for the haemoglobin averages of school children in Edinburgh, 1942, and is shown in the graph, together with the curve obtained of school children in Aberdeen, 1935. It will be seen that the number of children in the different age groups is much smaller in the Aberdeen series than in the present Edinburgh series. The Aberdeen figures were obtained from children of the poorest classes, and since the majority of them had haemoglobin levels of 90% or over, it was not considered necessary at the time to carry out further investigation in this age group. In Edinburgh, on the other hand, on completion of the survey of the first group of 197 children, only 9% were found to have haemoglobin levels of over 90% in spite of the fact that these children were in much better social circumstances than those in Aberdeen. Consequently it was deemed advisable to extend the survey to cover a larger group of individuals. A figure of 95% ± 5 selected by us as a standard of normality for healthy school children is based on our own experience, and coincides with the figure given by Whitby and Britton (1939).

The comparison shows that in Edinburgh, 1942, the haemoglobin level throughout this age period is considerably lower than in Aberdeen, 1935, the average difference for all ages being approximately 10%. In spite of this the children did not show obvious signs of malnutrition, and in fact the anaemia would not have been revealed unless haemoglobin estimations had been carried out.

It should be noted that the haemoglobin levels of the children reaching school age were found to be slightly lower in the Edinburgh series than in the pre-war Aberdeen series. Helen Mackay (1942) investigated a series of 364 children comparable in class with our present series. Her average figure for the age group 5 to 13 years was 80%, as compared with the Edinburgh figure of 80.3%. Thus in both these series there is seen to be a fall of approximately 10% from the pre-war Aberdeen figure of 90%.

The analysis of these three series of haemoglobin figures to show the percentage of children in various haemoglobin

groups is given in Table VI. This shows that whereas in the Aberdeen series not a single child had a haemoglobin of less than 80%, almost half of the children in Helen Mackay's series and more than half of the children examined by us in Edinburgh had haemoglobin concentrations below that level.

TABLE VI.—*Comparison of Anaemia in 3 Groups of School Children (5 to 12 Years)*

	No. of Cases	Percentage of Children in Different Haemoglobin Ranges			
		Hb < 71%	Hb 71–80%	Hb 81–90%	Hb > 90%
Edinburgh, 1942	389	8	45	40	7
		53		47	
London (Mackay, 1942)	128	42		68	
Aberdeen (Davidson, 1935)	67	0		100	

The children and also the infants in the Aberdeen investigation were drawn from the poorest section of the community at a time when the unemployment rate was extremely high. The weekly income assessed on the basis of "man value"* averaged only about 11s. per head in Aberdeen, in contrast with the present Edinburgh assessment of the family income of 520 women examined at ante-natal clinics, which ranged from 24s. to 39s. per "man value" per week.

It will be appreciated that in peacetime economic status is the chief factor influencing the nutrition of individuals; in wartime, on the contrary, "rationing" and the difficulty in obtaining some unrationed foods constitute the chief limitations, which, broadly speaking, are operative irrespective of income. This is probably the explanation of the higher incidence of anaemia noted by us during the present year in spite of the high figures for "man value" recorded. In support of this conclusion it is significant to note that since obtaining the data already recorded we have examined the haemoglobin concentration of 134 school children aged 5 to 12 years who were pupils in an Edinburgh secondary fee-paying school and who were drawn from a higher social and economic class than the children considered above. The average haemoglobin level for this group was 80.7%, a figure almost identical with that obtained for the 389 working-class children. The percentage of children falling in the different haemoglobin ranges was also similar.

The frequency and degree of anaemia present in school children from working-class families in Edinburgh in 1942 as reported in this paper call for the most careful consideration by both local and national authorities. It is obviously desirable that during the period of active growth and mental development the incidence of anaemia should be reduced to the lowest possible level. This can be achieved by one of two methods or by a combination of both. The first consists in the provision of school meals which are appetizing, well balanced, and rich in foodstuffs with a high iron content. Intensive propaganda must be undertaken to induce a much higher proportion of children to partake of such meals. The need for such propaganda is evident in Edinburgh, where, although the numbers are gradually rising, only some 20% of children are at present taking school meals. The second method is by supplying iron at the schools in the form of a tablet or a mixture, or incorporating it in some article of diet universally eaten, such as bread.

Investigations are at present being undertaken in Edinburgh to discover whether the anaemia can be prevented and corrected by diet alone or whether a supplement of iron is required.

Summary

The haemoglobin levels have been estimated in 831 infants, pre-school children, and school children from working-class families in Edinburgh. The results have been compared with a similar series examined in Aberdeen in 1935.

After three years of war no significant change was found to have occurred in the haemoglobin levels of infants, but a fall has been demonstrated in the case of school children.

* The "man value" figures obtained by us were calculated on the following basis: each member of the family was assessed according to age and sex in terms of one man as one unit, one woman as 0.8 of a man, and a child as 0.5 of a man.

We wish to express our thanks to Prof. Charles McNeil, Dr. G. J. Linklater, school medical officer, and Dr. T. Y. Finlay, medical officer for maternity and child welfare in Edinburgh, for the facilities and help afforded us by them during this investigation.

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PLASMA PROTEIN STORAGE

BY

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In a previous paper (Beattie and Collard, 1942) it was stated that after a moderate haemorrhage there was a significant movement of plasma protein into the blood stream. This conclusion was reached by demonstrating that the observed plasma protein concentration of the blood after haemorrhage was greater than a value calculated from the haemoglobin concentration before and after haemorrhage. Dr. Sharpey-Schafer has pointed out to us in a personal communication that the formula used was incorrect and gave expected values which were too high. He suggested the following formula:

$$p1 = p \times \frac{1}{1 + \frac{1}{x}\left(\frac{H}{H1} - 1\right)},$$

where p1 is the plasma protein concentration to be expected at, say, 75 minutes after haemorrhage, p is that observed at, say, 30 minutes after haemorrhage, H and H1 the haemoglobin concentration at 30 and 75 minutes after haemorrhage, and x is the plasma volume % divided by 100 at 30 minutes after haemorrhage. Using this method of calculating the expected value for the plasma protein concentration, we found that we had overestimated the true expected value by varying amounts ranging from about 3 to 15%. Consequently the movement of protein into the blood stream after haemorrhage was, in fact, much greater than we had reported. We are grateful to Dr. Sharpey-Schafer for pointing out our error. This movement of protein observed in anaesthetized cats has been recorded in human subjects bled comparable amounts (Stead, 1940; Wallace and Sharpey-Schafer, 1941). The view was expressed by us that the amount of protein entering the blood was determined probably more by the state of the protein reserves than by any other factor. After plasma transfusions in normal animals there is some evidence of an indirect nature that a movement of plasma protein out of the blood stream may take place (Beattie, 1942). As this outward movement was not constant in all experiments it may well be that it, too, is determined by the state of the protein reserves.

The sites of these reserve stores of protein have not been determined with certainty, but Madden and Whipple (1940), in a review of the evidence, considered that the liver was probably the most important store, although they admitted that direct evidence from hepatectomized animals and perfused liver experiments is at best equivocal. It was decided, therefore, to study the effects of plasma transfusions on hepatectomized animals and of varying protein concentrations in the perfusing fluid in perfused isolated livers. In addition, it was thought that by giving repeated plasma transfusions to normal animals it might be possible to determine whether the plasma protein reserves could be filled up rapidly and so allow the building up of high plasma protein concentrations in the blood within a relatively short time.

* Leverhulme Scholar, Royal College of Surgeons of England.

Methods

The animals used in all the experiments were cats anaesthetized with nembutal (50 mg. per kg. of body weight). They were heparinized during the experiments. Plasma used for transfusions, etc., was obtained from heparinized cats. The cells were separated immediately after the blood was withdrawn and the separated plasma stored at a temperature of 6° C.

Chemical.—Plasma proteins were estimated by the biuret method of Robinson and Hogden (1940) and haemoglobin by the alkaline haematin method of Wu (1922). Plasma volumes were determined by the dye method using T.1824 (Evans blue). Dye concentrations were estimated by a photo-electric colorimeter. A regression curve plotted from the dye concentrations in samples taken at 10-minute intervals was used to obtain the plasma volume before dye was injected (Hamlin and Gregersen, 1939). Deviations from the regression curve were used to estimate variations in plasma volume as described by the same authors. Fresh injections of dye at hourly intervals were given to check the values calculated from the regression curve.

Plasma specific gravities were estimated by the falling-drop method of Barbour and Hamilton (1926), and from these the plasma protein concentration was estimated by the formula suggested by Weech *et al.* (1936). These estimations were of value only in normal and hepatectomized animals, in which they checked closely with the values obtained by the biuret method. Plasma S.G. estimations are valueless in perfused liver experiments, as they show continued rises during the perfusions irrespective of changes in protein content (as determined by the direct biuret method). The substances or substance which gradually increased in concentration in the perfusing fluid were not determined, but were probably urea, lactate, or glucose, or a mixture of all. The *p*H of the perfusing fluid was not determined.

Physiological.—The livers for perfusion were removed after the animals had been bled rapidly from the abdominal aorta. An inflow cannula was tied in the inferior vena cava above the diaphragm. The common bile duct was ligated and a cannula tied into the gall-bladder in all except two animals which had small gall-bladders. The phrenic vessels were ligated close to the inferior vena cava, and the liver was then removed. It was placed on a cotton gauze sling, with the portal vein and hepatic artery free to drain through the gauze into a porcelain funnel. This was covered with a perspex lid through which projected the two cannulae. Perfusion was carried out in reverse, the inflow being through the inferior vena cava and the outflow through the portal vein. The perfusion pressure was maintained constant at 12 to 15 c.cm. above the upper surface of the liver by a reservoir fed by a pump which raised the perfusion fluid from the oxygenator. The outflow from the liver was passed into the oxygenator, where it fell on to a rotating perspex disk which threw the fluid on to the walls of a glass cylinder through which a stream of oxygen passed. The fluid collected at the bottom of the oxygenator, and from there was raised to the reservoir by a pump. The porcelain funnel and the oxygenator were immersed in water baths maintained at a constant temperature of 40° C. The temperature of the perfusing fluid was 36° to 38° C.

Hepatectomized animals were prepared by the one-stage method of Firor and Stinson (1929).

Observations

Repeated Plasma Transfusions.—Five animals (91, 92, 93, 100, and 106) were given repeated plasma transfusions. The results of these transfusions on the plasma protein concentrations are shown in Tables I to III. No. 91 was given 4 transfusions, each of 10 c.cm., at intervals of 30 minutes. In spite of the fact that the animal's plasma contained 8.3 g. per 100 c.cm., the transfusion of the relatively low protein plasma (6.84 g. per 100 c.cm.) caused a transient rise in the plasma proteins (8.64 g.), followed by a decline which brought the plasma proteins (8.06 g.) below the pre-transfusion level. A second transfusion of the same plasma produced no significant change in the protein concentration at the end of 29 minutes. A third transfusion of the same plasma produced a significant rise to 8.40 g. per 100 c.cm. in 29 minutes. The fourth transfusion, again of the same plasma, raised the protein level to 8.84 g. at the end of 45 minutes, and it remained at that level at the end of 60 minutes.

The changes seen in No. 92 resemble closely those in No. 91. This animal had an initial plasma protein concentration of 6.67 g. per 100 c.cm. It received 3 transfusions, each of 20 c.cm., at 45-minute intervals. The plasma transfused had a protein content of 6.05 g. per 100 c.cm. The first transfusion caused a transient rise in protein concentration to 7.24 g. in 16 minutes. The value had declined to 6.94 g. at the end of 41 minutes. The second transfusion produced a considerable rise to 7.72 g. in 10 minutes, which was maintained until the third transfusion was given. This caused a further rise to 7.99 g., and this level was maintained with some minor fluctuations for 55 minutes.

No. 93 was given 3 transfusions, the second 42 minutes after the first, and the third 118 minutes after the second. The first 2 transfusions were of 15 c.cm. and the third was 10 c.cm. The protein concentration of the transfused plasma was 7.14 g. per 100 c.cm. After a fall, the pre-transfusion level was almost regained 41 minutes after transfusion. The second transfusion produced no change in protein concentration, but the third caused a well-marked

TABLE I

No.	Plasma Volume before 1st Transfusion (c.cm.)	Plasma Protein Concentration before 1st Transfusion	Volume of Plasma Transfused (c.cm.)	Plasma Protein Concentration of Plasma Transfused	Plasma Protein Concentrations after 1st Transfusion (grammes per 100 c.cm.)							
					Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.
91	87	8·30	10	6·84	9	8·64	14	8·40	28	8·06	—	—
92	195	6·67	20	6·05	10	7·21	16	7·24	26	7·14	41	6·94
93	104	8·57	15	7·14	10	8·40	16	8·09	26	8·13	41	8·50
100	151	7·69	20	6·26	—	—	25	8·23	40	8·16	55	8·13
106	124	7·28	20	6·46	10	7·58	25	7·07	40	7·18	55	7·11

TABLE II

No.	Time between 1st and 2nd Transfusions (min.)	Plasma Protein Concentration before 2nd Transfusion	Volume of Plasma Transfused (c.cm.)	Plasma Protein Concentration of Plasma Transfused	Plasma Protein Concentrations after 2nd Transfusion (grammes per 100 c.cm.)									
					Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.
91	30	8·06	10	6·84	10	8·20	15	8·09	29	8·09	—	—	—	—
92	42	6·94	20	6·05	10	7·72	16	7·52	26	7·75	41	7·62	—	—
93	42	8·50	15	7·14	10	8·60	15	8·57	26	8·54	45	8·57	56	8·57
100	60	8·13	20	6·36	11	8·09	25	8·13	40	8·16	—	—	—	—
106	60	7·11	20	6·46	10	7·86	25	7·96	40	8·03	—	—	—	—

TABLE III

No.	Time between 2nd and 3rd Transfusions (min.)	Plasma Protein Concentration before 3rd Transfusion	Volume of Plasma Transfused (c.cm.)	Plasma Protein Concentration of Plasma Transfused	Plasma Protein Concentrations after 3rd Transfusion (grammes per 100 c.cm.)									
					Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.	Min. After	Pl. Prot. Conc.
91	30	8·09	10	6·84	10	8·26	15	8·26	29	8·40	—	—	—	—
92	43	7·62	20	6·05	10	7·99	15	7·75	25	7·92	40	7·89	55	8·09
93	118	8·50	10	7·14	10	8·67	15	9·22	25	9·15	40	9·25	85	9·28
100	45	8·16	20	6·36	10	8·13	25	8·13	40	8·16	55	8·30	—	—
106	45	8·03	20	5·88	10	8·26	25	8·26	40	8·33	—	—	—	—
*91	30	8·40	10	6·84	10	8·81	15	8·67	30	8·74	45	8·84	60	8·84

* These values were obtained for a 4th transfusion.

TABLE IV

No.	Composition of Perfusing Fluid	Plasma Protein Concentrations in Grammes per 100 c.cm.										
		0 Min.	15 Min.	30 Min.	45 Min.	60 Min.	75 Min.	90 Min.	105 Min.	120 Min.	135 Min.	150 Min.
150	50 c.cm. plasma .. 180 c.cm. Tyrode's soln. 80 c.cm. red cells ..	1·63	—	1·69	—	1·71	—	*1·75	1·47	1·50	1·52	1·55
153	170 c.cm. plasma	6·23	6·23	6·32	6·34	6·30	6·15	6·25	6·23	—	—	—
154	130 c.cm. plasma .. 40 c.cm. Tyrode's soln.	3·56	3·50	3·53	3·38	3·42	3·47	3·53	3·62	3·68	—	—
172	95 c.cm. plasma .. 55 c.cm. blood ..	6·49	6·32	6·37	6·34	6·28	6·11	6·27	6·24	—	—	—
173	65 c.cm. plasma .. 100 c.cm. blood ..	6·82	6·71	6·76	6·65	6·50	6·63	6·61	6·45	6·49	—	—

* 50 c.cm. Tyrode's solution added after this sample.

rise to 9.22 g. in 15 minutes. This new level was maintained for a further 70 minutes.

In No. 100 the second transfusion was given 1 hour after the first, and the third 45 minutes after the second. The plasma transfused was, as in the previous experiments, lower in protein content than the animal's own plasma. The first transfusion caused a rise in protein content from 7.69 to 8.23 g. per 100 c.cm. in 25 minutes. There was a slight decline over the remainder of the first hour. The second transfusion produced no change in protein concentration, and the third likewise, except at the final sample taken 55 minutes after this transfusion, when the protein concentration rose slightly to 8.3 g.

The reaction to the first transfusion in No. 106 was almost identical with that observed in No. 91. The second transfusion, 1 hour later, produced a considerable rise in protein content (7.11 g. to 7.86 g. per 100 c.cm.) in 10 minutes. The protein content continued to rise slightly for a further 30 minutes. The third transfusion, 45 minutes after the second, again caused a rise (8.03 g. to 8.26 g.), which was maintained for 40 minutes. The plasma used for the first and second transfusions had a protein content of 6.46 g. per 100 c.cm., while that for the third transfusion contained only 5.88 g. The protein content of the animal's plasma was considerably in excess of that in the transfused plasma.

Perfused Isolated Livers.—These experiments fall into two groups: (i) 5 experiments in which no plasma was added after the start of the experiment; and (ii) 4 experiments in which plasma was added. The results obtained in the first group are shown in Tables IV and V. The changes in plasma protein concentration are given in Table IV. Table V is calculated after allowing for losses due to

TABLE V

No.	Total Plasma Protein in Circulation at Start of Experiment A	Total Plasma Protein Lost by Sampling B	Expected Total Plasma Protein at End of Experiment C	Actual Total Plasma Protein at End of Experiment D	Difference between Cols. C & D as % of Expected Protein
150	3·75	0·32	3·43	4·03	+17·5
153	10·59	1·25	9·34	9·35	—
154	6·05	0·32	5·73	5·93	+3·5
172	8·11	0·79	7·32	7·02	−4·1
173	8·53	0·60	7·93	7·24	−8·7

sampling. In the 2 livers (Nos. 150 and 154) perfused with low protein perfusing fluid there was a rise in plasma proteins. The increase is greatest in the liver perfused with the lowest plasma protein fluid (No. 150). No change was found in No. 153, which was perfused with a fluid containing plasma protein in the concentration of 6.23 g. per 100 c.cm. Livers perfused with fluid containing a higher plasma protein concentration than 6.23 g. per 100 c.cm. (Nos. 172 and 173) apparently removed protein from the circulation.

whole 2 hours there was an increase in total plasma protein of 7.9%. No. 165, also perfused with fluid of low protein content, showed no significant change in concentration over a period of 50 minutes. When 1.10 g. of protein was added the concentration returned to its initial level about 1 hour later. Protein had been lost from the perfusing fluid. Perfusion with a much higher protein concentration in No. 167 led to a fall of 8.2% in concentration in

TABLE VII

No.	Total Plasma Protein in Circulation at Start of Experiment A	Total Plasma Protein Added to Circulation B	Total Plasma Protein Lost by Sampling C	Expected Total Plasma Protein at End of Experiment (A+B−C) D	Actual Total Plasma Protein at End of Experiment E	Difference between Cols. D & E as % of Expected Protein
164	5·40	1·31	0·32	6·39	7·01	+9·7
165	6·12	1·10	0·34	6·88	6·22	−9·6
167	12·65	1·23	0·90	12·98	12·95	—
170	6·56	1·85	0·72	7·69	7·89	+2·6

50 minutes. After 1.23 g. of protein had been added, the concentration returned to the starting level. The addition of 40 c.cm. of Tyrode's solution failed to produce any output of protein from the liver, and consequently the total protein at the end of the experiment was almost identical with that expected. The last experiment (No. 170) showed a rise in plasma protein concentration of 3.7% in 1 hour. The addition of 1.85 g. of protein increased the concentration by a further 3.9%. The gross increase in total plasma protein, however, exceeded by only 2.6% the value expected.

Hepatectomized Animals.—These animals were observed for a control period before giving plasma transfusions. The changes in their plasma protein and haemoglobin concentrations are shown in Table VIII. Of these, 4 animals (Nos. 147, 158, 162, and 168) maintained their haemoglobin concentrations within ±3% of the first value. An examination of the dye disappearance curve shows that their plasma volumes appeared to be constant within narrow limits. No observations of plasma volumes were made on No. 168. No. 161 showed a marked increase in plasma volume and a corresponding reduction in haemoglobin concentration. The plasma protein concentration did not fall parallel with the fall in haemoglobin concentration. No. 166 showed an actual increase in plasma protein concentration, with a reduction in haemoglobin concentration and a rise in plasma volume. Calculating the changes in total plasma proteins, it was noted that Nos. 147 and 158 showed no evidence of movement of plasma protein into or out of the blood. No. 162 showed a decline of 4%, which is probably significant. Nos. 161 and 166 showed evidence of movement of plasma proteins into the blood (Table IX).

After a known amount of plasma had been transfused into 4 animals the changes in haemoglobin and plasma protein concentrations were observed and plasma volume estimations made (Table X).

TABLE VI

No.	Composition of Perfusing Fluid	Vol. of Plasma Added (c.cm.)	Pl. Prot. Conc. of Added Plasma	Protein in Added Plasma (g.)	Plasma Protein Concentrations in Grammes per 100 c.cm. at 10-Minute Intervals														
					0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
164	200 c.cm. plasma–Tyrode mixture ..	20	6·53	1·31	2·70	2·80	2·95	2·99	—	2·99	*3·05	3·19	—	3·40	3·49	3·49	3·46	—	—	—
165	242 c.cm. plasma–Tyrode mixture ..	19	5·79	1·10	2·53	2·53	2·66	2·45	2·53	*2·53	2·62	2·89	2·88	2·59	2·66	2·57	2·51	—	—	—
167	170 c.cm. plasma, 38 c.cm. normal saline	20	6·13	1·23	6·08	5·86	5·84	5·73	5·83	*5·58	5·83	5·89	5·93	†6·08	5·10	5·03	5·30	5·21	5·18	5·10
170	125 c.cm. plasma	25	7·40	1·85	5·47	5·36	5·48	5·05	5·08	5·46	*5·67	5·47	5·72	5·77	5·74	5·89	5·89	—	—	—

* Plasma added after this sample. † Tyrode's solution added after this sample.

The second group again had experiments with low and high protein content in the perfusing fluid (Tables VI and VII). No. 164, perfused with a plasma containing only 2.7 g. per 100 c.cm., showed an increase in protein concentration over a period of 60 minutes of 13%. The percentage increase in concentration in the second hour was 13.4, although 1.31 g. of protein had been added. Over the

An analysis of these results (Table XI) showed that 3 out of the 4 animals (Nos. 147, 158, and 162) lost protein in substantial amounts, and 1 animal (No. 161) gained over 5% plasma protein. Without placing too much reliance on the actual values, it is clear that plasma protein movement out of and into the blood stream does take place in hepatectomized animals.

Discussion

After repeated transfusions with plasma of a protein content lower than that of the animal's blood, the plasma protein content showed significant rises in 4 out of the 5 animals, and a rise of doubtful significance in 1 (No. 92). Analysing these results, it can be seen from Table XII that 4 animals (Nos. 91, 92, 93, and 106) lost the major portion of the transfused fluid from the circulation. One animal (No. 100) lost about half the transfused fluid.

The plasma protein added to the blood was retained in the circulation in 2 experiments (Nos. 92 and 100), and considerable fractions of it left the circulation in the others (Nos. 91, 93, and 106). Presumably, the greater part of this "lost" protein entered the protein stores.

Retention of plasma protein in the circulation may be accomplished by increasing the concentration to a much higher level and by expanding the blood volume. In No. 92 the former factor is predominant, and in No. 100 the latter. The question may be asked: "What determines whether plasma protein moves from the blood or is retained in it?" It has been suggested (Beattie and Collard, 1942) that the state of the plasma protein stores may be the most important factor.

If this be the explanation, then we have to assume that the plasma stores in Nos. 92 and 100 were well filled and could accommodate no more plasma protein. Examining these experiments in some detail, the effects of the first transfusion of low protein plasma are of interest. Determining the total plasma proteins from the animal's and transfused plasma volumes and the plasma protein concentrations, this value is divided by the concentration observed at certain time-intervals, thus giving the plasma volume to be expected. Assuming that no plasma protein has entered the blood stream, the plasma volume of No. 92 at 10 minutes after transfusion ought to be 197 c.cm., which would mean that 18 c.cm. of fluid had disappeared from the blood. However, as the haemoglobin concentration had declined from 102.0 to 95.84, it is clear that such a movement of fluid could not have occurred. Plasma protein must therefore have left the plasma stores and entered the blood stream. The subsequent fall in plasma protein may be due either to movement of fluid into the blood or protein out of it. If the former were the cause, the haemoglobin concentration would show a continued fall; in fact, however, it rose slightly to 97.54 at 16 minutes and 97.84 at 26 minutes, and fell slightly to 97.0 at 41 minutes. It must be concluded that there has been a reverse movement of protein into the stores.

TABLE VIII.—*Hepatectomized Animals*

Haemoglobin and Plasma Protein Concentrations before Transfusion

No.	Time (min.)	Hb	P.P.	Time (min.)	Hb	P.P.	Time (min.)	Hb	P.P.	Time (min.)	Hb	P.P.	Time (min.)	Hb	P.P.	Time (min.)	Hb	P.P.
*147 ..	0	100·0	5·65	11	103·0	5·61	21	101·6	5·65	31	102·0	5·51	—	—	—	—	—	—
158 ..	0	100·0	7·35	11	98·63	7·21	21	100·3	7·18	31	100·0	7·18	41	100·0	7·14	—	—	—
161 ..	0	100·0	8·33	15	94·4	8·03	20	91·8	—	25	91·8	7·86	30	92·1	7·96	—	—	—
*162 ..	0	100·0	7·00	10	100·3	6·66	20	100·3	6·66	30	103·0	—	40	103·0	6·86	—	—	—
166 ..	0	100·0	6·58	15	96·8	6·70	25	97·4	6·67	35	95·0	6·73	45	94·4	6·82	—	—	—
168 ..	0	100·0	7·11	12	99·3	7·18	24	99·65	7·18	34	98·6	7·07	44	98·95	6·87	53	98·3	6·60

* These animals received either plasma or glucose (5%) before this sample.

TABLE IX

No.	Beginning of Experiment			Duration of Experiment (min.)	End of Experiment					Gain or Loss as % of Total P.P. at Beginning of Experiment
	P. Vol.	P.P. Conc.	Total P.P.		P. Vol.	P.P. Conc.	P.P. in Circulation	P.P. Lost in Sampling	Total P.P.	
147	70	5·65	3·96	31	69	5·51	3·80	0·17	3·97	—
158	68	7·35	5·00	41	68	7·14	4·86	0·14	5·00	—
161	133	8·33	11·08	30	144	7·96	11·46	0·16	11·62	+4·9
162	101	7·00	7·07	40	97	6·86	6·65	0·14	6·79	−4·0
166	124	6·58	8·16	45	131	6·82	8·93	0·13	9·06	+11·0
168	—	7·11	—	53	—	6·60	—	—	—	—

TABLE X.—*Hepatectomized Animals*

No.	P.V. before Trans. (c.cm.)	Vol. of P. Trans. (c.cm.)	P.P. Added (g.)	Hb and P.P. Conc. after Plasma Transfusion. 10-minute Intervals													
				0		10		20		30		40		50		60		70	
				Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.	Hb	P.P. Conc.
147	69	25	1·78	102·0	5·51	89·8	6·22	87·9	6·19	84·9	5·92	82·7	5·82	82·0	5·68	82·7	5·68	82·2	5·65
158	68	30	1·92	100·0	7·14	80·4	7·18	78·2	7·11	77·7	7·01	80·4	6·94	—	—	—	—	—	—
161	144	45	2·64	92·1	7·96	74·1	7·86	74·4	7·65	75·4	7·86	75·2	7·79	73·1	7·79	72·9	8·03	—	—
162	97	40	1·20	103·0	6·86	90·0	6·19	85·6	6·37	88·2	6·14	89·1	6·23	89·4	6·19	93·4	6·02	—	—

TABLE XI

No.	Beginning of Experiment			P.P. Added by P. Trans. (g.)	Total P.P. at End of P. Trans. (g.)	End of Experiment					Gain or Loss as % of Total P.P. at beginning of Experiment
	Vol.	P.P. Conc.	Total P.P.			P. Vol.	P.P. Conc.	P.P. in Circulation	P.P. Lost in Sampling	Total P.P.	
147	69	5·51	3·80	1·78	5·58	85	5·65	4·80	0·41	5·21	−6·6
158	68	7·14	4·86	1·92	6·78	85	6·94	5·90	0·14	6·04	−10·9
161	144	7·96	11·46	2·64	14·10	182	8·03	14·61	0·23	14·84	+5·3
162	97	6·86	6·65	1·20	7·85	103	6·02	6·20	0·19	6·39	−18·6

TABLE XII

No.	Before Transfusion			Vol. of Plasma Trans. (c.cm.)	P.P. Added (g.)	End of Experiment			Net Gain or Loss of P.P. (g.)	Net Gain or Loss of Fluid (c.cm.)
	P.V. (c.cm.)	P.P. Conc.	Total P.P. (g.)			P.V. (c.cm.)	P.P. Conc.	Total P.P. (g.)		
91	87	8·30	7·22	40	2·74	93	8·84	8·22	−1·74	−34
92	195	6·67	13·01	60	3·63	209	8·09	16·90	+0·26	−46
93	104	8·57	8·91	40	2·86	107	9·28	9·93	−1·84	−47
100	151	7·69	11·61	60	3·80	184	8·30	15·27	−0·14	−27
106	124	7·28	9·03	60	3·76	140	8·33	11·66	−1·13	−44

The second transfusion produced a similar effect. The plasma protein concentration rose sharply at 10 minutes and, after fluctuating at 16 and 26 minutes, fell slightly at 41 minutes. The haemoglobin concentration moved in the reverse direction, rising from 97.24 at 10 minutes to 100.1 at 41 minutes after transfusion. Flow and ebb of plasma protein from and into the stores must have occurred. The third transfusion showed clearly that the same events have taken place. As the haemoglobin 10 minutes after transfusion was identical with that at 55 minutes after, no substantial movement of fluid could have occurred. Hence the final rise in plasma protein concentration must have been due to the plasma protein added from the stores.

An analysis of No. 100 showed that the large loss of transfused fluid was shared equally between the three transfusions. The loss was rapid and complete within 10 minutes, as the haemoglobin concentrations at the 10-minute and subsequent samples after each transfusion were within 1.6% of each other. The changes in plasma protein concentrations do show, therefore, after the 10-minute samples, the ebb and flow of protein from the stores to blood and of blood to stores. The small amplitude of this tidal movement, coupled with the fact that the values for the plasma proteins are high, suggests strongly that this animal, too, had well-filled protein stores.

Saturation of the protein stores can be accomplished by repeated plasma transfusions. No. 93, after 2 transfusions, showed a final plasma protein concentration of 8.57 g. per 100 c.cm. 56 minutes after the second transfusion, identical with the value at the start of the experiment. A third transfusion raised the level to 9.22 g. in 15 minutes, and maintained it there for a further 20 minutes. In No. 91, at 29 minutes after a third transfusion, the plasma protein concentration was only slightly higher than the level before the first transfusion. The fourth transfusion raised the level significantly and maintained it there for 1 hour. Saturation of stores was completed by the second transfusion in No. 106, and a subsequent transfusion raised the level still higher and maintained it for a further 40 minutes.

In view of Madden and Whipple's (1940) opinion that the liver is an important site for the storage of protein, it seemed possible to test on this organ the suggestions outlined above. Madden and Whipple envisaged a steady state, or ebb and flow, between the plasma proteins and those in body cells. That idea presupposes two reservoirs of protein, one in the blood stream and the other in reserve in tissue cells. A state of equilibrium between the two reservoirs tends to appear, and the speed with which it is accomplished will depend on the "gradient" between the "levels" of protein in the tissue cells and that in the blood stream. If the level of available plasma protein is low in the tissues, then high degrees of hypoproteinaemia may persist. On the other hand, a high level of protein in the blood stream will only remain high if the protein reserves are also high.

The isolated liver experiments show clearly that the liver can mobilize and throw into the perfusing fluid quantities of plasma protein (Tables V and VII, Nos. 150, 154, 164). The stimulus for this production is obviously the low plasma protein concentration of the perfusing fluid. There is, too, in these experiments a correlation between the degree of "hypoproteinaemia" and the rate of plasma protein production. One experiment (No. 165), in which the plasma protein concentration was low, showed no change in concentration over 50 minutes. It may be presumed that the reserves were also low in this liver, and this is supported by the fact that the addition of 1.10 g. of plasma protein produced a temporary rise and then a disappearance of all the added protein inside 1 hour. Equilibrium between stores and circulating protein seems to be suggested in one experiment (No. 153). Protein was lost from the perfusing fluid in two experiments (Nos. 172, 173). The loss was greater in the experiment with the higher plasma protein concentration.

When plasma was added to the perfusing fluid about 1 hour after the experiment had begun, the results obtained again seemed to depend partly on the state of the reserves and partly on the concentration of protein in the perfusing fluid. One liver (No. 164) showed a continuing output of protein after the addition of plasma, while another (No. 165), perfused under precisely the same conditions with a perfusing fluid almost identical with that used in No. 164, showed a loss of the added plasma protein. Previous to the addition, this liver had added no protein to the perfusing fluid, and hence it can be presumed that the reserves in this liver were low. Another liver (No. 167), perfused with a rich plasma protein fluid, lost protein from the circulating fluid. The added plasma protein produced a rise in concentration, and presumably all of it remained in the perfusing fluid. The addition of Tyrode's solution merely diluted the perfusing fluid without producing any further addition of protein. The remaining experiment (No. 170) showed a small rise in concentration before plasma was added. The added protein remained in the perfusing fluid, although from the values obtained for protein concentration it would appear that there was at first a movement out of the perfusing fluid, followed by a movement in the reverse direction.

There can be no doubt, therefore, that the liver does behave as a "store" for plasma protein. It remained, however, to determine if it was in fact the only store. Hepatectomized animals were prepared and after variable periods given plasma transfusions. Two animals (Nos. 147, 158) showed no change in total plasma proteins before they were given a transfusion. One (No. 147), at 70 minutes after the transfusion, showed an appreciable loss of protein out of the circulation. The other (No. 158) lost a greater amount in 40 minutes. Another animal (No. 162) had lost some protein before transfusion and continued to lose an even greater quantity afterwards.

These results may indicate a movement of protein into other stores, but they are not as convincing as evidence of movement from such stores into the blood. Such evidence is provided by Nos. 161 and 166. Over a period of 30 minutes, while blood dilution was proceeding, No. 161 raised its total plasma protein by a small but significant amount. No. 166, over a period of 45 minutes, also while blood dilution was proceeding, raised its total plasma protein by 11% over the expected value. No. 161 continued to add protein to its circulation after a plasma transfusion at about the same rate as before transfusion,

The evidence from these experiments does suggest that plasma protein leaves the blood stream in hepatectomized animals in quantities greater than might reasonably be required for normal metabolism, and, conversely, these animals seem to possess some source of plasma protein other than the liver.

The speed with which protein may enter or leave the blood stream or perfusing fluid lends support to Whipple's view that protein can move as such from cells to plasma, and plasma to cells, as the need arises. It is clear, too, that the storage mechanism is not capable of dealing with large quantities of excess protein added to the blood. A rising plasma protein concentration after repeated plasma transfusions is an indication of saturation. The site of the protein stores cannot be pinned down exclusively to the liver. Whether all body cells can contribute protein to the blood stream with the facility with which they apparently can withdraw it has yet to be decided.

Summary

Repeated plasma transfusions show that the plasma reserve stores may become saturated with protein and that further transfusions will lead to a rising plasma protein concentration and plasma volume.

The liver can add to or abstract plasma protein from the blood. The direction of the movement depends on the state of the liver's reserves and the plasma protein content of the blood.

Protein stores from which plasma proteins may be derived, or in which plasma protein can be stored, exist apart from the liver.

We wish to thank our technical staff for the assistance they have given in carrying out these experiments.

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TONSILLECTOMY BY GUILLOTINE AND DISSECTION

BY

T. B. JOBSON, M.D., B.Ch.

Controversy regarding the best method of enucleating tonsils is ever with us. Even now there are a great many relevant points that are not appreciated by the majority of doctors and some specialists. As one who has had to perform some 15,000 of these operations by both methods, I feel that analysis of this controversy may be of interest.

Taking the guillotine operation, let us inquire why such a lot of bad work is done by this method and why it has got a bad name in many quarters. The modern "reverse" technique was introduced in 1910 by Whillis and Pybus of Newcastle. They described their results in 200 cases in the *Lancet*. Very little notice was taken of their work in this country, but in America the idea was adopted by Sluder, who with the proficiency of practice brought his skill in the method to a very high level. In fact, he claimed that his results showed 99.6% of complete enucleation in children. His advocacy of the method brought back to this country its use by surgeons who appreciated the improved technique and who had opportunities of gaining skill by practice.

Reasons for Poor Results with the Guillotine

It may be asked why the results achieved by the guillotine are so variable. Restricting the discussion for the moment to children, let us inquire why some doctors firmly believe that a tonsil cannot be completely removed with the guillotine. Indeed, a good many of the public (instructed by their doctors, no doubt) are of the same opinion. There is some justification for this view, for undoubtedly a great deal of bad work is done with the guillotine. Now, why should this be? If Sluder can produce 99.6% of complete enucleations, the method cannot be at fault. My experience assures me that it is not at fault. Why, then, does not the method yield such excellent results universally? Several reasons suggest themselves.

Many doctors imagine that tonsils can be removed by anyone as soon as he can write M.R.C.S. or B.Ch. after his name. They think that tonsils are like ripe strawberries, ready to be plucked off. They are confirmed in this opinion when two or three come out successfully. The fact that the fourth or fifth is badly done does not shake their complacency. But this means 20% bad results—enough to give the method a bad name. The fourth is perhaps a "mushy" tonsil. The lymphoid tissue strips off, leaving the capsule behind with remnants of tonsil tissue. The next may be one with a horizontal cleft near the lower pole, inviting the ring of the guillotine to be placed in the cleft, and so leaving a lower pole. Again, perhaps the capsule is thickened and there is difficulty in invaginating the tonsil into the ring of the guillotine. Too much pressure is used with the finger, and it perforates the anterior pillar. The pitfalls are many and are not realized at first.

The bad results are not noticed by the parents. The surgeon "gets away with it." In other operations, such as appendicectomy or hernia, a bad one will become manifest immediately, so it follows that the surgeon learns to do these under supervision and does not attempt them until he is competent. The analogy with golf is rather apt. The member who has just been elected sees the professional tee up a ball and drive it down the fairway 250 yards. It looks so simple, but the beginner does not find it so. He has to practise and practise; after a time he gets to the stage of missing one shot in four, but his handicap is then only 18. He has to have lessons and do more practice before his handicap gets down to single figures. Only a few reach the scratch mark—those who are endowed with a fine touch and good muscular co-ordination. So it is with guillotine tonsillectomy. It requires good "hands" to start with and long—very long—practice to achieve anything like 100% success. Also, the surgeon must be able to use his left hand as well as his right.

Another cause of poor results is that at many hospitals tonsil operations are left to the house-surgeons unsupervised. They do their best, but their results cannot reach the desired 100% goal in their short period of residence, and their successors repeat this unsatisfactory process. There is another reason for the odium cast on the guillotine. Many of our surgeons who restrict themselves to the dissection method and who never had the opportunity or desire to persevere with the long practice required for expert guillotine work are apt to condemn the method and noise it abroad that the only satisfactory method is by dissection. To justify this they point to some of the bad results outlined above.

Finally, the removal of a child's tonsils and adenoids in a minute or two with the guillotine is a much less spectacular operation than a set dissection lasting ten times as long. The parent may think he is getting better value for his money for the longer operation, which is not always the case.

I have nothing to say against the dissection operation. It is an excellent method, and in adults is, I think, the method of choice. It is more easily learned, and a good many house-surgeons learn it fairly well in their six-months period—although further practice is required before they become experts.

The Methods compared in Adults

So far I have dealt with the guillotine operation in children. It may be of some interest to compare the value of the two methods in adults. To get some evidence on this point I have during the last two years tried out the method of dissecting one tonsil and guillotining the other—alternately right and left. Analysis of the first 100 cases showed that 11 were unsuitable for the guillotine. These were cases of very flat tonsils, some which had had a previous operation, some with a very thickened capsule, the result of quinsy, etc. In the other 89 cases observation notes were made on: (1) haemorrhage, (2) appearance of the tonsil bed, (3) after-pain.

The results showed practically no superiority of either method. The desired slit-like bed was more often achieved by the guillotine. Those requiring a ligature were about equal. My conclusion, then, is that the guillotine method is not applicable to all cases in adults—and also that it requires a great deal more skill to get good results than is the case with children. The dissection method is therefore, I consider, the method of choice in adults. In this method each surgeon develops his own technique. One point I would like to emphasize, and that is the importance of dissecting up the mucous membrane from the pillars and upper pole and then "delivering" the tonsil from underneath this fringe of mucosa, which will then form a covering for the edges of the pillars. This procedure greatly lessens after-pain and prevents cicatricial contraction of the pillars.

It is interesting to recall that Whillis and Pybus in their first 200 cases claimed only 65% of perfect tonsillectomies. Compare this with Sluder's results a few years later. In 1924 I published a paper on this subject.[1] In this I estimated the number of completely successful results at 95%, but now I believe even this is too low. By immediate inspection of the bed and examination of the tonsil removed it can be ascertained if a fragment has been left. This can be dissected out in a few minutes. Such a necessity is very rare, but its recognition is important if we aim at perfect results.

It must not be thought that tonsillectomy by dissection is always easy. The difficult tonsil for the guillotine is difficult for dissection, and the results by this method are not always perfect. As in every operation, skill increases with practice, and skill is more rapidly gained in dissection than in the guillotine method. Serious bleeding does not often occur, but it can be very alarming and indeed dangerous. The surgeon therefore must be competent to deal with haemorrhage in the tonsil bed. Finally, our aim must be "to remove the tonsil, the whole tonsil, and nothing but the tonsil." The guillotine is more likely to fail in the second, dissection to err in the third, of these aims.

Anaesthesia

Our routine for adults is intratracheal ether with packing of the hypopharynx. This helps to prevent the possibility of

1 *Practitioner*, 1924, 113, 100.

inhalational pneumonia or lung abscess. For the guillotine operation in children ethyl chloride is used, and for dissection in children a short ether anaesthesia. The children are given 1 to 2 grains (according to age) of seconal an hour before operation, and one hopes that this will obliterate any memory of the operation. Again we find the improvement in statistics since our specialist anaesthetist has been appointed for this purpose. Many years ago, when changing house-surgeons gave the anaesthetics, we had two or three fatalities, but for five years since this anaesthetist has been doing the work we have had none.

The conclusion is that the appointment of special surgeons and anaesthetists has raised the standard of tonsillectomy to a very high level.

ATYPICAL "INFLUENZAL PNEUMONIA" AT A SCHOOL

BY

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During a period of three months, March to May, 1942, a small but peculiar epidemic occurred at the evacuated section of Highgate School, at Westward Ho. The history of the outbreak may be considered worth recounting.

Symptomatology

The outbreak had the external appearance of an influenza. The temperature at the start was seldom more than 102°, and remained so for one or two days; it then dropped to between 99° and 100°, and remained there from 3 to 7 days. The symptoms, in the main, consisted of a mild headache or a sore throat; apart from the temperature the only positive finding was a pharyngitis. After a week or less the temperature became normal and the symptoms cleared up. After a further period of 2 to 7 days, however, the temperature suddenly rose again, in one or two cases quite steeply, and remained above normal for some days, in a few instances for a fortnight or even longer. During this period a cough often appeared, and in a few cases a few very faint crackling rales were heard over a localized area of one lung.

In these cases radiological examination of the chest was carried out, but, owing to the long distance from the hospital, this was possible only after some delay, when the journey could be undertaken without too much risk. In all these cases (7), with one exception, a typical *x*-ray picture was found: an area of one lung-field was distinctly blurred—frequently the lower third of the right lung-field—the movement of the corresponding dome of the diaphragm was impaired, and in one case there was a small effusion in the costophrenic angle. The homogeneous shadow was similar to that of a resolving area of pneumonic consolidation. Later control radiographs revealed that this diffuse shadow had disappeared and the lung-field showed no abnormality. In two cases, however, a recrudescence occurred after an interval of 4 to 6 weeks, with exactly the same symptoms, and repeated radiographs showed that the previous pathological shadows had become more marked.

In all, there were 28 cases of "influenza" during the same period, which may, of course, have belonged to quite different types. In one group of about 10 cases the symptoms were very slight, and lasted a few days only. Of the remainder, 12 cases showed the typical features described above, consisting of a two-stage illness, separated by an afebrile interval of apparently complete health.

In this second group 7 cases were radiographed; 6 of them showed residues of a diffuse inflammatory process in an area of one lung. The following history is typical of one such case:

A schoolboy aged 14. No previous history of importance. During Easter holidays, at the beginning of April, 1942, he was in bed with a mild influenzal attack, slight unproductive cough, and temperature just over 99°, which settled down in a week. He was quite fit for a month, but on May 14 developed a febrile cold again, and the temperature rose to 99.8°, but was normal again on May 17 and 18. On May 19 the temperature was 102.6° in the morning; sulphapyridine was given 4-hourly and it fell to 99.2° in the evening. At this time some crepitations were heard over the right lower lobe behind. By the 21st the temperature had settled to normal and remained so.

X-ray examination, May 26 (A. J. M.).—"Screening: Upper lung-fields light up brightly and evenly. There is some increased density at inner angle of right dome of diaphragm, and outer sulcus of same is blurred. Film: This confirms screening report. There is very slightly diminished translucency over right upper lung-field compared with left. There is some increased density and striation at inner angle of right base, and filling up of outer sulcus of right dome. The *x*-ray appearance suggests a residual inflammatory process at right base following influenza." June 9, screen only: outer sulcus of right dome of diaphragm has now cleared.

In this case the administration of sulphapyridine appears to have speeded up recovery; but other cases, not treated with it, took a similar course, and its value in this type of illness must therefore remain doubtful.

Conclusions

Unfortunately, extensive bacteriological investigations have not been possible, and we cannot say to what type of pneumonia these cases belonged. Nevertheless, their publication seems to us desirable for the following reasons: (1) The course of the illness is not typical for an influenzal pneumonia; it might even belong to another group of virus disease. (2) As no other cases have been noted in the district among adults, it may be that the illness attacks mainly adolescents. (3) Owing to the mildness of the illness and the absence of any marked symptoms, it will rarely lead to hospital treatment, and its special characteristics and complications may easily be overlooked; the attention of the practitioner should therefore be drawn to it.

Medical Memoranda

An Unusual Case of Injury to the Female Urethra

Injury to the female urethra apart from childbirth or operative procedures is very uncommon. This is presumably because of its comparatively well-protected position and shortness. In the male, on the other hand, injury to the urethra is more frequent, and it is well known that it is usually caused by falling astride an object. In the case here described an injury was sustained by a woman which we consider to be comparable to the well-known injury to the male urethra. Interest is added to the case when it is learnt that the patient was wearing trousers at the time of the injury.

CASE HISTORY

A married woman aged 38, a unipara, had just returned from her work as a milk roundswoman, and was putting up black-out curtains in her home, climbing on to the window-sill to do so, when she slipped and fell astride the back of an ordinary wooden chair. Her fall was fairly heavy: she was apparently standing about 4 feet above the chair when she slipped. It appears that she came down so that a projecting knob on the corner of the chair struck the anterior part of the vulva and anterior vaginal wall. She felt an immediate "numbing" pain, and after a few seconds found that she was bleeding profusely.

On admission to Hendon Cottage Hospital there had been a fair amount of haemorrhage, which was seen to be coming from an extensive tear in the anterior vaginal wall and vestibule. This tear extended transversely across the anterior vaginal wall at the exact level of the urethral orifice and each end of the tear split into two directions, one running backwards and upwards into the vagina, and the other forwards on to the vestibule. There was also considerable bruising of all the parts, and a large haematoma had formed under the anterior end of the left labium. There was no sign of the urethral orifice.

Under an anaesthetic given by one of us (R. H. C.) the patient was put in the lithotomy position and the tear carefully examined (D. J. N. S.). It was then seen that the urethra had been torn away from the vaginal wall and was lying free in nearly all its length in a space between a flap of anterior vaginal

wall posteriorly and the posterior surface of the symphysis pubis in front. The free lower end of the urethra was caught with forceps, brought down, and a catheter passed. Clear urine came from the catheter, and saline was injected into the bladder and the volume checked. It was then obvious there had been no injury to the bladder. A plastic repair was done, and the mouth of the urethra sutured as nearly as possible in position, a stitch being placed to anchor it to the periosteum of the postero-inferior surface of the symphysis pubis. An in-dwelling catheter was left in, and the vagina packed with mercurochrome gauze.

Recovery was rapid. The pack was removed in 24 hours and the catheter in a week. The bruising and haematoma of the vulva rapidly disappeared and the patient was discharged after a fortnight. There was complete control over micturition, no stress incontinence, and the vagina healed without stenosis.

COMMENTARY

The features of this case are the rarity of the injury and the circumstances of its occurrence—exactly similar to the way in which rupture of the male urethra is produced. What is very interesting is that the patient was dressed in trousers at the time of the accident. In addition she had thick underclothes on beneath the trousers, which were themselves made of thick serge, so that the injury was produced entirely by contusion just as the male urethra is ruptured. It is probable that had the patient been wearing a skirt she would not have been injured, and clothing may be a factor in the prevention of injuries to the female perineum. It raises the question, of course, as to whether surgeons must be prepared to see such cases, as fashion dictates that increasing numbers of women shall wear trousers!

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Persisting Epilepsy following Shock Therapy

The rare occurrence of spontaneous fits over a long period following shock therapy is illustrated by the following case.

CASE REPORT

The patient, a man aged 22, first came under my care on Sept. 19, 1940. He had had convulsions at intervals for six months when 1 year old. From 7 to 14 he suffered from an illness described as chorea—he now shows physical signs consistent with a diagnosis of a compensated rheumatic heart lesion. At 20 he had his first mental breakdown, a depressive illness lasting six months. A year later he was diagnosed as a schizophrenic, and had spent a further year in mental hospitals and been treated with ten therapeutic convulsions when he came under my care. He was dull and retarded, but suspicious, moody, and freely hallucinated—a typical "chronic" schizophrenic. Blood examination showed 4.9 million reds, haemoglobin 75%, and sedimentation rate normal; the urine was repeatedly found clear and normal. From Sept. 23, 1940, to Jan. 2, 1941, he was given a course of insulin therapy, the coma dose rising from 80 to 952 units, and 19 comas followed 63 injections. The course was complicated by occasional severe coma fits and after-reactions. Treatment by T.A.B. vaccine was then tried, 13 intravenous doses, rising from 5 million to 750 million bacilli, being given between Jan. 4 and Feb. 21, 1941. On Jan. 19 a spontaneous fit occurred, and two more were recorded in January and four more up to Feb. 15, accompanied by mental improvement, when 1 grain of phenobarbitone each night was prescribed. This controlled the fits; but the mental state relapsed, and the drug was discontinued on Feb. 28. A fit occurred on March 3, 1941, and six in March altogether, with five more by April 15, when he left my care considerably improved mentally.

The firm impression gained was that his spontaneous fits controlled his schizophrenia, and this continued satisfactorily until July, when further phenobarbitone therapy stopped the fits and heralded another mental relapse. He came under my care again; the medication was terminated and one electric convulsion given, and this was followed by one or two spontaneous fits a week, with mental improvement. Inquiry on Dec. 12, 1941, elicited the information that the fits continued and he remained cheerful and sociable, occupying his time rug-making and playing the piano. A further report dated June 28, 1942, states that he still has one or two fits weekly, and that epanutin was tried and stopped the fits; but it made him mentally worse and had to be abandoned. His mental condition, all things considered, remains good.

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Reviews

PAEDIATRICS

Nutrition and Chemical Growth in Childhood. By Icie G. Macy, Ph.D. Volume I: Evaluation. (Pp. 432; illustrated. $5.00 or 27s. 6d.) Springfield and Baltimore: Charles C. Thomas; London: Baillière, Tindall and Cox. 1942.

Management of the Sick Infant and Child. By Langley Porter, M.D., B.S., and William E. Carter, M.D. Sixth revised edition. (Pp. 977; illustrated. 57s. 6d.) London: Henry Kimpton. 1942.

A Handbook on Diseases of Children, including Dietetics and the Common Fevers. By Bruce Williamson, M.D., F.R.C.P. Third edition. (Pp. 364; illustrated. 12s. 6d., plus 6d. postage.) Edinburgh: E. and S. Livingstone. 1942.

Wartime Food for Growing Children. Issued for the Ministry of Food by the Ministry of Information. (Pp. 25. 4d., or 13s. 4d. for 50 copies.) London: H.M. Stationery Office. 1942.

Dr. Icie G. Macy has provided a valuable collection of facts in her *Nutrition and Chemical Growth in Childhood,* the first volume of which is entitled "Evaluation." Many years of experience, wide reading, and the collaboration of colleagues have gone to the making of this book, which is essentially a record of the scientific methods required and the results obtained in the study of nutrition in childhood with particular reference to the biochemical aspect. A second volume, to be called "Interpretation," is promised for next year. Meanwhile the paediatrician will be grateful for a collection of valuable data, and especially for the results of balance experiments conducted by a method of rapid micro-analysis which gives results quickly after the collection of samples and opens the way to a wider use of this method of studying nutritional problems. The publication of this volume has been made possible by "The Children's Fund of Michigan" and it is introduced in a foreword by Dr. Hugo A. Freund, who is president of the board of trustees of the fund.

Another notable paediatric publication from the United States of America is the sixth edition of the well-known *Management of the Sick Infant and Child,* by Prof. Langley Porter and Dr. William E. Carter. This is a product of the California University Hospital, and continues in its extensively revised form to be a thoroughly practical account of the care of the sick child. Details of treatment are stressed throughout, and the method of approach in the early chapters through the dominant symptom—e.g., "vomiting," "diarrhoea," "haemorrhage"—has much to commend it. Both authors are widely experienced, and they have the fortunate help of many colleagues in certain sections of the book. The sections on therapeutic procedures are of particular value.

The third edition of Dr. Bruce Williamson's little work—*A Handbook on Diseases of Children*—also bears marks of extensive revision, especially that necessitated by the introduction of the sulphonamide drugs. But it is by no means up to date, for there is no mention of gentian violet for threadworms, of atebrin for lamblia, or of modern views on icterus gravis neonatorum. The dangers of raw milk (even the higher grades) are not sufficiently stressed.

Wartime Food for Growing Children is another collection of Dr. Charles Hill's informal broadcasts in the popular "Kitchen Front" series. The information imparted is essentially sound and practical, and practitioners would be well advised to recommend it to parents. The value of suet in puddings (when available!) is perhaps underrated, but critical reading has failed to reveal any other departure from modern paediatric standards. The broadcasts read as well as they sounded.

THE VITAMINS

Chemistry and Physiology of the Vitamins. By H. R. Rosenberg, Sc.D. (Pp. 674. $12.00 or 72s.) New York: Interscience Publishers Inc.: London: Imperia Book Company.

Dr. Rosenberg was tempted at first to write one book on the vitamins and hormones, since the two classes of compounds have so much in common. The task, however, proved too big and he wisely confined his effort to an account of the vitamins only. He has made a praiseworthy search of the literature, giving exact references to more than 3,000 original papers in footnotes on the appropriate pages, with an index to these references at the end of the book under the names of authors arranged in alphabetical order.

The subject-matter is systematically arranged in chapters on vitamins in general, the groups of vitamins A, vitamin B_1 (thiamin), vitamin B_2 (riboflavin), vitamin B_6 (pyridoxin), nicotinic acid (nicotinamide), pantothenic acid, inositol, para-aminobenzoic acid, vitamin C (ascorbic acid), the group of vitamins D, the group of vitamins E, vitamin H (biotin), the group of vitamins K, vitamin P, non-identified vitamins (including B_3, B_4, B_5, B_7, B_8, B_c, B_p, J, L_1 and L_2, M, T, U, folic acid, growth factor for *Lactobacillus casei*, grass juice factor, mouse factor, anti-pernicious-anaemia factor). An appendix is devoted to the vitagens (including essential fatty acids, amino-acids and carbohydrates, and choline and related compounds). There is also a patent index giving the patent number, date, patentee and assignation, and claims of about 1,200 patents dealing with vitamin preparations. Each chapter has sections, where possible, on nomenclature and survey, chronology, occurrence, isolation, properties, constitution, synthesis, industrial methods of preparation, biogenesis, specificity, determination, standards, physiology of plants and micro-organisms, animal physiology, avitaminosis and hypovitaminosis, and requirements. Provitamins A and provitamins D are treated nearly as fully as the corresponding vitamins.

Dr. Rosenberg has dealt most fully with the chemistry of the vitamins. Syntheses are clearly explained, and are lavishly illustrated by structural formulae. We would like to have seen described Bourdillon's work on the preparation of pure calciferol from the irradiation products of ergosterol; it is scarcely mentioned. However, the omissions we most regret on behalf of readers of this *Journal* are the accounts of clinical trials with the vitamins. There is no mention of Dr. Martha Elliott's comparison of the efficacy of vitamins D_2 and D_3 with regard to the curing and prevention of rickets in young children (the most convincing evidence of their equality yet published); or of Dr. Helen Mackay's work on the influence of a shortage of vitamin A on young children; or of Mellanby's work on the influence of vitamin A on convulsive ergotism and lathyrism, and on overgrowth of bone, which may affect parts of the nervous system (especially the auditory nerve); or of his solution of the toxamin problem. There is only one sentence (a very inadequate one) dealing with Lady Mellanby's work on the influence of vitamin D on the development of caries, and none on her work on gingivitis. There is no mention of the use of cod-liver oil in wound-healing, though whether the benefit is due to vitamin A is uncertain. The biological standardization of the vitamins is treated very scrappily, some of the work referred to being obsolete, and there is no statement of the general principles underlying the methods now accepted. In spite of these defects, however, much remains in the book to render it acceptable to workers on the subject, and many parts of it will stimulate readers to make therapeutic trials of the vitamins, for they can scarcely do harm and they may bring about results of inestimable value.

"THE MYSTERY OF THINGS"

The Circle of Life. A Search for an Attitude to Pain, Disease, Old Age and Death. By Kenneth Walker. (Pp. 158. 7s. 6d.) London: Jonathan Cape. 1942.

Lotze said that a philosophical system is an attempt to justify a fundamental view of things which had been adopted early in life, and Mr. Kenneth Walker, as a child, sensed the unity of all life. Unlike Wordsworth, that vision of his has not faded but grown with the years. The present parlous state of civilization is compelling man to take a humbler view of his position in the universe so that he is more inclined to admit the interdependence of all living things. In *The Circle of Life*, which may be regarded as a sequel to his *Diagnosis of Man*, Mr. Kenneth Walker essays to help towards an understanding, though naturally not a complete solution, of the problems of disease, pain, suffering, old age, and death. His conclusion is that the meaning can only be found if the subject be examined from the standpoint of the whole aggregate of life on the earth. A disease caused by a pathogenic organism instead of being a meaningless accident is then seen to be an inevitable consequence of the conditions obtaining in organic life. Bacteria can be allies as well as enemies; indeed, "micro-organisms form, as it were, the base of a living triangle, the two sides of which are the vegetable and animal worlds." In his survey he has many interesting things to say: thus "we need not question the purposive action of fear, because in excess it defeats itself"; "life cannot be measured in terms of years but only in terms of inner experience"; "longevity is not a question of miraculous draughts or diets or hormones or grafts, but of right living, both of the body and of the mind"—a valuable comment this, from one with professional experience.

"Man," said Sir Thomas Browne, "is the great Amphibium"; he dwells in two interpenetrating worlds—the visible one of living matter, the invisible one of the spirit. As is well known, Mr. Kenneth Walker has for some years found a harmony for this in Oriental philosophy. He recognizes, however, that "a branch of knowledge cannot be isolated from Eastern thought and grafted on to a culture which is entirely foreign to it"; but as "Eastern and Western people barter the products of their industry . . . surely the time has come when with even more mutual profit they can exchange the products of the mind." Yet even his customary lucidity leaves us with but a vague and unsatisfying impression of Eastern philosophy. His discussion of "occult" phenomena naturally includes a consideration of the time-space continuum, and we were delighted to see his reference to Dr. E. A. Abbott's parable *Flatland*, which, published more than 50 years ago, brought home in a simple form the lesson that our minds are inevitably limited to three-dimensional conceptions.

Mr. Kenneth Walker deserves our thanks for a book at once stimulating and comforting. His medical experience enables him to rob death of much of its terrors for the uninformed. He devotes some space to the consideration of various theories about the hereafter. As to this we do well in following Shakespeare, one of whose greatest characteristics, according to Keats, was his capacity for "being in uncertainties, mysteries, doubts, without any irritable reaching after fact or reason."

Notes on Books

The 28th edition of *Gray's Anatomy* is stated to have been "produced under conditions of unprecedented difficulty"; the editors, Prof. T. B. JOHNSTON and Dr. J. WHILLIS, however, with the assistance of Prof. F. Davies—the digestive system—and Dr. Denny Brown—the nervous system—have succeeded in overcoming all hindrances and have added much new matter which is of importance from the purely scientific and the practical standpoints, more particularly with regard to the sections dealing with development, myology, neurology, and the ductless glands. Many new illustrations have been added, including *x*-ray plates, by Cairns showing the position of the cerebral ventricles; Allison, the course of the parotid and submandibular salivary ducts; and Grout, a cholecystogram. An interesting memoir of Prof. Howden, who, succeeding Pickering Pick, was editor of *Gray's Anatomy* for 27 years, is contributed by the senior editor of the present volume. Prof. Howden was specially interested in the central nervous system and sense organs, the description of which, more particularly of the internal ear, is largely founded on his personal observations. The present editors may be congratulated on raising still further the high standard of utility and accuracy of previous editions, and there is no doubt that the popularity of *Gray's Anatomy* will continue as of yore. Longmans, Green and Co. are still the publishers, and the price is 60s.

In *Health for the Young* (George Allen and Unwin, 6s.), written for the lay public, Dr. LINDSEY BATTEN displays his customary robust common sense. He could have chosen as his text, "It is not the function of the doctor to suggest ill-health," nor for that matter of anyone else, for (as he rightly points out) advertisements of patent remedies would convey the impression that health is a thing that can only be precariously maintained. "With the decline of faith in a benevolent Providence and the countervailing rise of faith in Science goes a quite unjustified disbelief in the power of living organisms to right themselves." His hard hitting at the prevalent fads and cranks of the day is refreshing, and his practical hints on the maintenance of health and the provision of an enjoyable life for the young should prove decidedly helpful.

No. 4 of Vol. 13, dated March, 1942, of the *Index to the Literature of Food Investigation* has been published by the Department of Scientific and Industrial Research at 4s. 6d. The items run from Nos. 1454 to 1939. Those who wish to obtain this *Index* regularly should send orders direct to the Sales Office, H.M. Stationery Office, York House, Kingsway, W.C.2, or to any bookseller.

"WAR AND THE ADVANCEMENT OF SOCIAL MEDICINE"

SIR WILSON JAMESON'S HARVEIAN ORATION

The Harveian Oration—the only one of the lectures of the Royal College of Physicians of London to be given this year in public session—was delivered on October 19 by Sir Wilson Jameson, Chief Medical Officer of the Ministry of Health. The President of the College, Sir Charles Wilson, was in the chair.

Sir Wilson Jameson began by remarking that William Harvey's life was cast in times of national stress like the present. He was a boy of 10 when the Spanish Armada came up the Channel, and at the age of 64 he was caught in the travails of the Civil War. Such times had always been followed by periods of great social change. The Napoleonic wars furnished a convenient first example. After them came the first Factory Acts, the abolition of slavery in the British Empire, the beginnings of elementary education, and the social emancipation brought about by the reform of Parliament. After the Crimean War, the heroine of which was Florence Nightingale, with her reforms of Army hygiene and nursing, came the growth of liberalism in politics, a new apprehension of the meaning of social justice, and, in hygiene, the beginnings of State medicine.

The South African War touched the conscience of England, partly because of the disclosures concerning the physical unfitness of many Army recruits, partly because of the excessive mortality from disease in the field, and partly because of the conditions in the concentration camps for Boer women and children. The demand for social change was faced in the new Parliament of 1906. The immediate consequences were the provision for feeding, physical training, and medical examination of school children, the beginnings of the campaign for the prevention of infant mortality, workmen's compensation for accidents, old age pensions, housing and town planning, and, eventually, National Health Insurance.

After the First World War

Then came the first world war, the effect of which upon the progress of social medicine was profound. The destruction of young manhood sharpened the need for saving life wherever possible. There was an extension of schemes for the care of mothers and infants and the medical treatment of school children, as well as the establishment of welfare work in industry. As soon as the armistice was signed the Ministry of Health was created. Shortly before the last war there had been a Medical Research Committee under National Health Insurance, but its admirable secretary, Sir Walter Fletcher, made it truly national in its application to the immediate medical necessities of the war, and the Medical Research Council, as it now became, was no merely academic body, but a living and dynamic force for the saving of human life. A concentrated effort was made to combat tuberculosis, and the major local authorities were required to make adequate provision for diagnosis and treatment. Slum clearance schemes were also effected, and later a sweeping measure of Poor Law reform was brought about. In the meantime medical education did not stand still, and the beginnings of two noteworthy movements might be detected at this time, issuing presently in the establishment of the London School of Hygiene and Tropical Medicine and the British Postgraduate Medical School.

What would be the effect on the progress of social medicine of the ordeal through which the world was now passing? He detected a marked difference between the feelings of medical men—and of others—in the last war and in this. In the last war it was the general desire to get back to things as they were, an impatience to resume the old tasks and privileges; but in this war there was everywhere a conviction that great changes were impending. It might be that immediately the war was over an extensive programme of social reform would be introduced, of which social medicine would be an integral part.

Present Gains

Sir Wilson Jameson went on to enumerate some present gains which would surely not be lost in time of peace. Already a co-ordinated hospital scheme existed to meet the needs of the war. Many more hospital appointments had been created, many institutions had been improved out of all recognition—"upgraded," to use the official jargon. The Ministry of Health had itself added 47,000 beds to the total of those already provided by voluntary agencies and local government authorities, and had set up special hospitals for the treatment of head injuries, for neurosurgery, for neuroses, and for rehabilitation. Consultants had been redistributed and their services made available in many places where such provision had formerly been wholly inadequate. Operating theatres had been provided and additional wards built. Laboratory services had been established, for one of which—the Emergency Public Health Laboratory Service—the Government accepted full responsibility. In this work he acknowledged the help of the Harvard Red Cross Medical Unit, which represented by no means the only medical wartime debt which was owing to their professional colleagues in North America.

Again, immunization against diphtheria had become part of the Government public health programme. New methods of attack on tuberculosis had been introduced. The value of miniature radiography must not be overestimated, but it had its use as a means of sorting out the cases which required further examination, and the Minister of Health had undertaken to see that as many sets of apparatus as possible were made available during wartime. A real nutritional policy had been formulated which included collaboration between the Ministries of Health, Food, and Agriculture. There was nothing more praiseworthy than the efforts which had been made in this direction. At last we had obtained as a result of the necessities of the war what had been lacking in the past. A national plan for the collection of hospital morbidity statistics, compiled in accordance with an approved classification, had been set up. Finally, more than ever before, health was in the "news," and prevention had acquired some of the drama of cure.

Encouraging Signs for Peace

There were signs that these gains in time of war would be consolidated. As evidence of the determination to secure much-needed reforms Sir Wilson Jameson mentioned the recent statement of Government policy in relation to hospitals, which was already being implemented by the initiation of surveys in various parts of the country; the adoption by the Royal Colleges of criteria for the training and status of future consultants; the appointment of an interdepartmental committee on the organization of medical schools and the facilities available for clinical teaching and research; and the appointment by the Royal College of Physicians of two other committees—one dealing with the medical curriculum and the other with social medicine. The college had always regarded medical education as one of its main concerns. Here he paid a tribute to the forward policy of Oxford University in establishing a chair of social medicine and to the Nuffield Provincial Hospitals Trust for its support of the university in this venture. Another piece of evidence was the official measures set on foot for the improvement of the status and conditions of work of nurses.

Then there was the setting up by the British Medical Association of the Medical Planning Commission and the character of its interim report. "Surely we are entitled to read into this report a realization on the part of the medical profession that their continued existence as a series of isolated units is in the interests neither of themselves nor of the public they serve. If private practitioners are to take their proper place the medical profession will have to submit to some agreed measure of reorganization."

He concluded with a reference to the part which must be played by the Fellows of the Royal College in moulding the pattern of post-war social reforms. If they were to play their part they must remember Harvey's exhortation to the Fellows and Members in the terms of the Trust by which he brought this annual oration into being "for the honour of the profession to continue in mutual love and esteem amongst themselves."

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THE FATE OF PLASMA PROTEINS IN TRANSFUSION

Whipple and his co-workers,[1] in a series of brilliant investigations covering a period of many years, have shown conclusively that the proteins in the cells consist of a part which is necessary for the life and efficient functioning of the cell and a part which can leave the cell protoplasm without apparently affecting the cell's activity. When for any reason the concentration of the proteins in the plasma is reduced—for example, after haemorrhage—protein leaves the body cells and enters the blood stream. If the amount of protein available in the body cells is adequate, the plasma protein concentration may be restored to its normal value; if the protein available is small, the concentration may reach equilibrium at a value below normal. In this event, restoration to the normal value is effected slowly by a synthesis of new protein by the liver from the products of digestion of proteins in the food.

Beattie,[2] after a study of the effects of haemorrhage in experimental animals, came to the conclusion that movement of protein into the blood stream must take place in substantial amounts within a short time after haemorrhage. In a further paper[3] it was shown that after controlled haemorrhages the rate of addition of plasma proteins to the blood is not parallel to the rate at which fluid enters the blood in order to restore the blood volume to its normal level, and does not depend on the amount of blood withdrawn. Beattie regarded these observations as indicating differences in the amount of protein available in the body cells which could be transferred to the blood stream as plasma protein. It was fortunate that a short time previously Wallace and Sharpey-Schafer[4] had made a series of observations on the effects of haemorrhage on human subjects which demonstrated that exactly similar changes took place in man after haemorrhage. In one subject it was found that an average of 13 g. of plasma protein could enter the blood every hour, over a period of 4 hours. This is probably about the maximum replacement rate, and the general rate is much less. However, it is possible, as Beattie[5] has pointed out, that in the first hour after haemorrhage the rate may be even greater. Mass movements of plasma protein in these amounts are obviously of the greatest importance in the mechanism of recovery after blood loss. Whipple and his colleagues[6] have found that infections may slow down or stop the rise in plasma concentration, and have attributed this effect to the drain on the cellular proteins to provide protein bodies used in the manufacture of antibodies and to replace protein lost in inflammatory exudates. Obviously, then, the state of the "stores" of available protein in the body is of importance in the combating of bacterial infections.

1 *Phys. Rev.*, 1940, **20**., 194
2 *British Medical Journal*, 1942, **1**, 459.
3 Ibid., 1942, **2**, 301.
4 *Lancet*, 1941, **2**, 393.
5 Ibid., 1942, **2**, Oct. 17.
6 *J. exp. Med.*, 1936, **63**, 277.

The location of the actual site of the stores of protein which can be mobilized and passed into the blood stream, either to raise its protein concentration or to replace wastage from any cause, is discussed in a paper by Beattie and Collard in our present issue (p. 507). A study of data collected by Sharpey-Schafer and Wallace[7] showed that transfusions of plasma or serum in man could be followed by a rapid removal of fluid from the blood stream, as indicated by a maintenance of the haemoglobin concentration at its pre-haemorrhage level. At the same time there was a parallel removal of protein from the blood: the rate of removal was of the order of 4 to 8 g. per minute. As at the same time there was no indication of a rise in the rate of protein breakdown, it may be presumed that the protein leaving the blood entered the protein "stores." Beattie and Collard show that repeated transfusions of plasma into animals were followed, after considerable quantities had been transfused, by a permanent rise in plasma protein concentration. These findings they interpret as indicating that the cells of the protein "stores" could hold no more protein. The amount of protein which can be removed from the blood in man and animals after plasma transfusions is so great that it seems unlikely that the liver alone can be the storehouse. Beattie and Collard, in the same paper, show that hepatectomized animals can store protein and mobilize protein into the blood stream. Consequently the mechanism of protein storage may involve the body cells generally.

These observations are of great practical importance. They demonstrate clearly that the reinforcement of the body's protein reserves may be as important a use for plasma transfusions as their employment to increase blood volume after haemorrhage. The making good of protein losses caused by tissue damage, exudate production, and the formation of antibodies can be effected rapidly from the reserve proteins in the cells, and only much less rapidly by the formation of new protein from the food. A successful defence against bacterial invasion needs ample protein reserves. Apart from these acute conditions, there are many more chronic ones which can be benefited by amplifying the reserve proteins. Once inside cells, the reserve proteins can be used not only to raise plasma protein concentration but also to assist in haemoglobin formation and to provide protein needed to replace normal tissue wastage. The ebb or flow of protein between the cells and the plasma under different conditions emphasizes Whipple's concept that the body proteins are in a state of dynamic equilibrium, the level of which is determined essentially by the state of the protein stores.

CONTROL OF MALARIA IN PALESTINE

Palestine in the last war was the seat of important military operations. It has assumed considerable importance in the present war. Our experiences in 1918 showed it to be a distinctly malarious country, and there seems some ground for believing that malaria might well have led to a less successful issue of the campaign than was fortunately the case. Since then there have been many happenings in Palestine, and many changes. A report of some 40 folio pages, entitled "A Review of the Control of Malaria in Palestine (1918-1941)," recently issued by the Department of Health is, in view of these facts, very opportune. After a brief introduction it gives concisely the salient facts about the population, social and economic conditions, and the physiographical and meteorological features

7 *Lancet*, 1942, **1**, 699.

of the country. This is followed by a section on "the anopheles carrier and its habits" and one on "endemicity." In the concluding half or so of the report the control measures that have been undertaken, and their results, are dealt with. Altogether 9 species of anopheles have been recorded in Palestine, of which *A. bifurcatus* (*A. claviger*), from its habit of breeding in cisterns and wells and its close domestic association with man, is outstandingly the most dangerous carrier species, more especially in the towns. In the rural areas *A. elutus, A. sergenti,* and *A. superpictus* are all dangerous, as experience has shown them to be wherever they are found. Perhaps the most noticeable feature in respect to species is that *A. maculipennis,* which assumed such importance in Macedonia in the last war, does not occur. Palestine, as a matter of fact, lies just south of the great faunal frontier which in its own sphere, like a political frontier, rules the distribution of species. Malaria is almost everywhere endemic in Palestine, though not as a rule hyperendemic. Epidemic manifestations occur from June to September and from August to September, the former due chiefly to an increase in *vivax* infections and the latter to an increase in *falciparum* malaria. Not the least interesting part of the report is that referring to malaria in relation to our troops in the last war. Whilst stationary on the Auja River line, where antimalarial operations were actively carried out, malaria was not excessively prevalent, but with the advance in September into new country it became a serious menace. How far relative escape from malaria whilst the troops were stationary was due to the operations or to the season not being sufficiently advanced is perhaps uncertain, but there is no question that at the height of the season in October malaria was of tremendous importance both to our troops and to the enemy. The report mentions that German sources give 60% as the incidence of malaria among German and Austrian troops in spite of prophylactic quinine.

The Department of Health began to function seriously from 1920 onwards, attention being at first given chiefly to the towns. By 1922 the rural scheme was in full operation. The inspection of areas and the preparation of schemes based on this were an important activity; 15,430 such inspections were made in 1920, 12,429 in 1921, and 13,219 in 1922. By 1923 so much improvement in the general incidence of malaria had taken place that it was found possible to discontinue the free distribution of drugs except in schools. From 1924 onwards intimate and detailed attention to malaria prevention has been the rule in every town and large village. Reclamation schemes, drainage, dusting with Paris green, visitation of schools, arrangements for the supply of quinine, and other methods have been among those most widely employed. The results as shown by general experience and statistics are extremely satisfactory. The percentage of malaria to total treated in the dispensaries fell from 7.2 in urban areas and 3.2 in rural areas in 1922 to a percentage never higher since the last-mentioned date than 0.7. The spleen rate in the children of both urban and rural areas has likewise fallen. Compared with 1919, the figures in this respect are very striking—e.g., in 1919 the spleen rates for Jerusalem, Safad, Haifa, and Jaffa were respectively 44.3, 68.7, 39.0, and 16.6; in 1940 they were 1.6, 1.0, 0.9, and 0. Not only are these operations carried out by the Health Department during two decades highly satisfactory as having achieved great improvement in both urban and rural areas, but the knowledge and experience so gained of the local conditions in relation to malaria and its prevention should be invaluable to the military authorities in this region. Five excellent maps accompany the report.

VITAMIN C AND RESISTANCE TO INFECTION

Much has been written on the role of vitamins in infection, but critical observations on a large enough scale among human communities are relatively few. Glasebrook and Scott Thomson[1] have now reported the results of a careful study of the effects of the administration of vitamin C on the general health and resistance to infection of boys living in their training school. Though published in the third year of the war, the work was done in the peaceful days of 1938. The institution was a large one, and the distribution of food to its population of 1,500 youths aged from 15 to 20 years was badly managed. Often 8 hours elapsed between the time the food was cooked and its arrival on the dining tables. In the meantime it was kept hot in electric ovens. Analysis showed that the total daily intake of vitamin C of each boy was not more than 10 to 15 mg. Urinary saturation tests showed that the vitamin C depletion of the boys was serious. When some 200 mg. of crystalline vitamin C was given daily to groups of boys the urinary output rose only very slowly, and saturation levels were not reached until after 15–23 days. Thereafter the administration of 50 mg. daily maintained excretion at a level indicative of optimal intake. The training school was divided for administrative purposes into divisions, and youths of each division worked as a unit and occupied certain tables in the dining hall. Observations on the relation of vitamin C to resistance to infection were made by supplying pure vitamin C over a period of several months to one or more divisions. The most common infective conditions in the establishment were coryza and "tonsillitis"; the latter term is used by Glasebrook and Scott Thomson as an index of haemolytic streptococcal disease of the nose and throat and covers tonsillitis, sore throat, otitis media, pharyngitis, and cervical adenitis. Of the 335 boys who received vitamin C 21.2% developed common colds and 8.5% had "tonsillitis." Similar figures, 26% and 8.6% respectively, were observed for the 1,100 youths serving as controls. It was thus obvious that vitamin C had no effect on the incidence of either infection. Glasebrook and Scott Thomson then analysed the duration of illnesses in boys admitted to sick-quarters, where the period of treatment was completely outside their control. Over six months the average number of days spent in the sick-room due to infective conditions was 2.5 for a boy in the vitamin-C-treated division and 4.98 for a control boy. When the illnesses were differentiated it appeared that the administration of vitamin C had not shortened the duration of the common cold, which lasted on the average 6.3 days in the vitamin-C group and 6.4 days in the untreated youths. The effect on "tonsillitis" was, however, quite dramatic, as the average stay in hospital due to this disease dropped from 16.7 to 10.0 days as a result of administration of vitamin C, and the effect was statistically significant. It is, however, in the analysis of the more serious illnesses that the difference between the two groups was most striking. There were 17 cases of pneumonia and 16 of acute rheumatism among the 1,100 controls, but no case of either disease among the 335 treated youths. These findings again proved of definite statistical significance.

One could hardly ask for a clearer demonstration of the practical importance of an adequate supply of vitamin C; moreover, the findings of Glasebrook and Scott Thomson are confirmed by the results of the wartime mass administration in Germany of vitamin C to children and adolescents,[2] where the treatment seems to have reduced

[1] *J. Hyg.*, Camb., 1942, **42**, 1.
[2] *Ernährung*, 1941, **6**, 269.

the incidence and severity of "respiratory infections." Compared with such clear-cut results in the field, laboratory work is less conclusive. Fuller, Roberts, Ralli, and Francis[3] have tried to correlate certain immunological reactions in man with the level of vitamin C and of vitamin A in the diet, but found that the capacity of the nasal secretions to inactivate influenza virus, the titre in blood serum of neutralizing antibodies for influenza virus, the activity of lysozyme in the nasal secretions, the titre of complement in blood serum, and the phagocytic activity for pneumococci of polymorphonuclear neutrophilic leucocytes in whole heparinized blood were not affected by wide changes in the intake of vitamin A or C accompanied by wide fluctuations in plasma levels of these vitamins. Two of their subjects were rendered severely deficient in vitamin C without influence on the immunological phenomena. Such negative findings will doubtless stimulate further research. In the meanwhile war conditions offer both incentive and opportunity for the study of the more practical aspects of the relation of vitamins to infection. There are welcome signs that medical men in the Forces and among the civilian population are giving this urgent matter the attention it deserves.

RAT-BITE FEVER

Though cases of so-called rat-bite fever are continually reported from all quarters of the globe, few have come to light in this country. The last two clinically typical cases described in England followed cat-bites, and in only one instance was an agent, *Spirillum minus*, isolated. Most workers have accepted *Sp. minus* as the aetiological agent in this disease since its isolation by Futaki *et al.*[4] in 1916. They described their micro-organism as a spirochaete, but because of its rigid body and terminal flagella Robertson[5] suggested its inclusion under the spirilla. Many unexplained clinically typical spirillum-negative cases have, however, been described from Japan and other countries. It now seems possible that these have been caused by infection with *Streptobacillus moniliformis*, which has been occasionally isolated in the past from various human illnesses, but until recently has not been seriously considered as a cause of rat-bite fever. In 1933 Strangeways[6] found that *Str. moniliformis* was apparently a normal inhabitant of the nasopharynx in 50% of the laboratory rats which she examined and was also present in four wild rats. This is in striking contrast to the unsuccessful attempts to demonstrate the spirillum in the mouths of rats. *Str. moniliformis* does not grow readily on ordinary laboratory bacteriological media, but grows well on the special solid and liquid media which have been devised for its culture. When possible cases have turned up in the past the usual procedure has been to inject the patient's blood, a lymph gland from the inflamed region, or a piece of the excised wound into guinea-pigs or mice shown not to be harbouring any spiral micro-organisms. Recently Brown and Nunemaker,[7] in a review of the literature and cases occurring in the U.S.A. from 1916 to 1940, found that comparatively few cases of proved spirillar aetiology have occurred. They point out that in every case both *Sp. minus* and *Str. moniliformis* should be sought for. With the use of the new special media for the latter it is interesting to note that of 9 recorded cases which occurred in the U.S.A. in 1939-40 an alleged aetiological agent was isolated in 5: *Str. moniliformis* four times and *Sp. minus* once. They themselves have investigated 8 cases, from 3 of which they isolated *Str. moniliformis*, and in the other 5 the patient's serum agglutinated the organism to an abnormally high titre. Larson[8] has also recently described 3 cases in the U.S.A., from one of which *Sp. minus* was obtained by animal inoculation; *Str. moniliformis* was isolated in a second, and was agglutinated to a high titre by the serum of the third case. None of these investigators has ever isolated both organisms from the same case. In both types of infection the main clinical features are the same. The wound at the site of the bite usually heals without any signs of local inflammation, but after about a week or two induration without suppuration occurs. Fever of a relapsing type develops, along with regional adenitis and lymphangitis. The remission of the fever is usually accompanied by decrease in the severity of the inflammation. A rash of some kind has been described in all the streptobacillus cases and many of those of sodoku. Both types usually show a leucocytosis. Brown and Nunemaker found that the most striking difference between the two types of illness was the high incidence of joint involvement in the streptobacillus cases. However, when Hershfield *et al.*[9] inoculated a large group of patients with *Sp. minus* as a method of treatment, 25% developed arthritis. Sera of a moderately high percentage of both types give a positive test for syphilis. The response to treatment with one of the antisyphilitic arsenicals is usually dramatic and complete in spirillar cases, but has not been so well marked in those caused by the streptobacillus. Recent successful chemotherapy with gold salts in the experimental disease of rats and mice with the streptobacillus and the related pleuropneumonia group of organisms suggests that this is probably a more suitable treatment for human cases of rat-bite fever of this type. Though few cases are likely to be seen in this country it is one more diagnosis to be considered in cases of so-called "P.U.O." with a rash and arthritis. Cases have been reported after bites by cats, ferrets, weasels, and ground-squirrels, dog contacts, cat scratches, and trauma; in one of the last probable cases described in England the patient had no knowledge of any such cause—but his barn was overrun with rats. This list suggests ample scope for possible infection of the large male population in the field in Great Britain.

THE CATARACT OPERATION

Cataract extraction has undergone steady and almost imperceptible changes during the last 20 years. Preliminary iridectomy, which some of the older surgeons used as a routine, is now performed infrequently and only in specially selected cases. Vitreous loss, which was the bugbear of the operation, is now a rarity in uncomplicated cases. This has been achieved largely by the introduction of blocking of the facial nerve at some point or other on its course to overcome squeezing of the eyelids on the part of the patient. Some surgeons use retrobulbar anaesthesia either by itself or with facial blocking, though most avoid this form of anaesthesia because of the lowering in tension it produces, sometimes making extraction of the lens a matter of some difficulty. With improved technique has come a revival of interest in the perennial problem of intracapsular extraction, and an increasing number of operators are resorting to this. One of the main objections to intracapsular extraction from the day it was first mooted about 70 years ago has been the greater tendency to loss of vitreous, and most operators have preferred a larger percentage of satisfactory results to a smaller percentage of brilliant results. With present-day

[3] *J. clin. Invest.*, 1942, **21**, 121.
[4] *J. exp. Med.*, 1917, **25**, 33.
[5] *Ann. trop. Med. Parasit.*, 1924, **18**, 157.
[6] *J. Path. Bact.*, 1933, **37**, 45.
[7] *Johns Hopk. Hosp. Bull.*, 1942, **70**, 201.
[8] *Publ. Hlth. Rep.*, Wash., 1941, **56**, 1961.
[9] *J. Amer. med. Ass.*, 1929, **92**, 772.

anaesthesia the danger of vitreous loss is appreciably less, and the objections which were previously valid may no longer hold, and it must be recorded as a fact that, whereas before intracapsular extraction was done only exceptionally by operators with special facilities, at the present moment its use is fairly widespread. An interesting contribution to this unsettled controversy comes from M. Klein[1] in an extensive survey of cataract extractions performed by the intracapsular method. The complications recorded are not formidable and compare favourably with results obtained by more standard methods. What is of particular significance in Klein's paper is the challenging suggestion that the vitreous loss is an overrated danger to the eye. The accepted teaching, which is well grounded, that vitreous loss carries with it a possibility of slow infection and retinal detachment is not supported by Klein's careful studies. It is possible that the apparent contradiction between the results reported by him and the accepted teaching reflects the change that has taken place in the operation and its complications. With the older methods of anaesthesia vitreous loss was generally on a formidable scale, and with the present methods this does not often happen. Slight vitreous loss, as Klein rightly insists, is a different entity from massive vitreous loss. This is perhaps the key to the paradox.

TOXICITY OF MERCURIAL DIURETICS

Recent reports of a number of sudden deaths in America following the administration of mercurial diuretics have prompted further investigation and a review of the subject. De Graaf and Nadler,[2] from a study of the literature, concluded that excessive diuresis may sometimes lead to dehydration and chloride loss sufficient to cause restlessness and confusion. A rapid diuresis is unsafe in a patient being given full doses of digitalis, as it may bring on the typical signs and symptoms of digitalis poisoning through mobilization of the drug from the tissue fluids. The toxic reactions most closely related to mercury itself are the disturbances of kidney and gut. On the gastro-intestinal tract the effect is characteristically stomatitis, salivation, and haemorrhagic colitis; but the use of theophylline-mercury derivatives may be expected to lessen the risk of mercurial poisoning owing to the more rapid excretion of the drug. The main changes in the kidneys comprise degeneration of the tubular epithelium, manifesting itself by the appearance of hyaline and granular casts, albumin, and white and red cells in the urine. This is presumably only an extension of the renal irritation responsible for mercurial diuresis, and so the presence of kidney disease is a contraindication to the use of mercurial diuretics, though such complications are comparatively rare. Chills, fevers, and reactions suggestive of anaphylaxis are probably seen no more often than with any other drug, and may sometimes be avoided thenceforward by changing to another of the mercury derivatives. The immediate fatalities so far recorded fall into an entirely different category. Within 2 to 6 minutes of the completion of an intravenous injection of a mercurial diuretic the patient coughs, flushes, and collapses; on examination the pulse is imperceptible. On some occasions[3,4] there is clinical evidence of a disordered action of the heart, with forceful irregular ventricular beats. This is comparable to the effect of injecting an excessive dose of the mercurial diuretics into healthy dogs[3] or cats,[5] in which electrocardiograms and direct observation show depression of the T wave and extrasystoles, followed by ventricular fibrillation and death. Acute fatalities have been recorded in sufferers from congestive heart failure[4] and other disorders of the heart, as well as in kidney disease. This is only to be expected from the rapidity of death after intravenous injection of a fatal dose, though De Graaf and Lehman[5] suggest that theophylline may modify the acute toxicity of some of the mercurials by hastening their excretion by the kidneys. These workers have also shown that "esidrone" is much more toxic than the other mercurials for an equivalent weight of mercury. In a small number of fatal cases there were premonitory symptoms during a previous injection, such as a transient rash resembling measles, dyspnoea, and cyanosis.

Due attention should be paid to such warnings. But it is necessary to correct the ominous impression that this account may have given of the mercurial diuretics. The number of fatalities so far recorded is very small compared with the large scale on which such drugs are used. Provided reasonable precautions are taken and administration is stopped when untoward reactions occur, there is no reason to restrict their use in suitable cases.

1 *Brit. J. Ophthal.*, 1942, **26**, 93.
2 *J. Amer. med. Ass.*, 1942, **119**, 1006.
3 Ibid., p. 1001.
4 Ibid., p. 1004.
5 Ibid., p. 998.

WORK FOR THE BLIND IN WARTIME

The blind community of England and Wales numbers 74,324, of whom 1,626 are under the age of 16. A fine example of British resilience under adverse conditions is given by the wartime work of the National Institute for the Blind as told in its annual report.[1] Far from accepting a purely defensive role on the outbreak of hostilities, the Institute moved into new fields of activity and was soon ready to deal with any war-blinded casualty that might occur among civilians. In this service an important part is played by the homes of recovery, where the newly blinded, from any walk of life, are nursed back to emotional health and prepared for the changed life ahead. There the terrifying reactions to sudden loss of sight "fade away in peaceful surroundings and days of interesting work and pleasure." Meanwhile, the normal services continue. Production of embossed literature has been halved by the paper shortage, but there has been a steady flow of short and topical reading matter. Also, to keep its blind operatives employed, the Institute has been preparing the stereo plates of a number of monumental works which will be printed when paper restrictions are at an end. The war has not hindered the massage services, and the section of the report under this heading will be of particular interest to medical readers, as giving proof of what blind masseurs and masseuses can accomplish after training by experts. With regard to employment generally, which is always a difficult problem, it is said that the labour shortage created by the war is "the golden opportunity for blind labour," and a committee has been set up to secure larger use of the blind in "sighted" factories. The latest annual report of St. Dunstan's is a 6-page leaflet issued from the administrative offices, Inner Circle, Regent's Park, N.W.1. It contains an article, "You Have Conquered Blindness," by the Chairman, Sir Ian Fraser, which might well be read aloud to every newly blinded Service man and woman in the very early days of his or her misfortune.

The Robert Jones Memorial Lecture, on "Congenital Dislocation of the Hip-joint," will be given by Prof. Harry Platt at the Royal College of Surgeons of England, Lincoln's Inn Fields, W.C., on Wednesday next, November 4, at 3.15 p.m.

1 Obtainable from 224, Great Portland Street, W.1.

War Medicine Series

The paper printed below is based on a lecture which was one of a series recently given at the British Postgraduate Medical School, Hammersmith

MEDICAL ASPECTS OF HEAD INJURY

BY

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Temporary Major, R.A.M.C.

The title of this paper is inappropriate, for there are no exclusively medical aspects of head injury. Surgeons, medical neurologists, and psychiatrists have all contributed to our knowledge of the subject, while experience of working in a hospital for head injuries makes it evident that those who wish to treat these injuries should be familiar with all three aspects of the condition, whether they be surgeons, physicians, or psychiatrists. In this short article I shall refer to elementary aspects of head injury which will be of practical help to those who treat these cases and to those who as yet have made no special study of the subject.

Those who have witnessed a severe closed head injury can readily appreciate the popular alarm which is prompted by this form of trauma. The sickening thud as the head strikes on a hard surface is followed by a physical state which is nearly related to death and which must necessarily suggest serious injury to the brain. Moreover, in medical practice we are all familiar with cases of the chronic post-concussional syndrome, which appears to cause marked disability for many years. These patients are unhappy invalids and are often resistant to treatment. Experience of cases such as these causes both the medical officer and the layman to take a pessimistic view with regard to prognosis in cases of head injury.

It is important, therefore, that there should be a clear understanding regarding the incidence of symptoms following head injury. Figures for Service cases are not yet available, but in the civilian closed injuries from road accidents, falls, etc., the following figures indicate that the incidence of post-concussional symptoms is much lower than is generally realized and that the duration of disability is surprisingly short.

In Table I 200 consecutive patients, admitted to the Royal Infirmary, Edinburgh, were interviewed 18 months after their head injury. They were asked about their symptoms since leaving hospital (including slight ones, such as nervousness, occasional headache, or giddiness); and the duration of any symptoms referable to the injury was noted.

Table I.—*Duration of Symptoms (Severe or Slight) after Head Injury in 200 Unselected Cases*

Duration of Symptoms	No. of Cases
Under 2 months	80
2–6 months	11
6–18 months	30
Over 18 months	79

It will be seen from the table that in 40% of cases there were no symptoms after 2 months, but in an equal number symptoms (often slight) persisted for over 18 months.

Table II.—*Duration of Unfitness for Full Work in 100 Working Men and Women under the Age of 50—Compensation Cases excluded*

Interval after Injury of Successful Return to Full Work	No. of Cases
Under 2 months	61
2–6 months	26
6–18 months	7
Unfit after 18 months	6

The severity of the post-concussional symptoms in the average case of the working man or woman is indicated by Table II, where the period off full work (following the injury) is recorded.

It should be noted that 87% had returned to *full* work within 6 months of the injury. Compensation cases and patients over 50 years of age were excluded.

Table III compares the period off work with the severity of the injury (as indicated by the duration of post-traumatic amnesia). This group consists of 92 working men and women under the age of 40.

Table III.—*Duration of Unfitness for Full Work compared with Duration of Post-traumatic Amnesia*

Interval after Injury of Successful Return to Full Work	Duration of Post-traumatic Amnesia		
	1 hour	1–72 hours	Over 72 hours
Under 2 months	30	25	4
2–6 months	1	8	13
6–18 months	1	3	3
Unfit after 18 months	0	1	3
Totals	32	37	23

This table gives a striking indication of the quick return to work of young people, even after severe injuries.

Table IV.—*Duration of Unfitness for Full Work compared with the Presence of Fracture of the Skull*

Interval after Injury of Successful Return to Full Work	Fractured Skull	No Fracture
Under 2 months	11	31
2–6 months	17	10
6–18 months	6	2
Over 18 months	6	7
Totals	40	50

In Table IV the rates of return to work in those with and without a fracture of the skull are compared: it demonstrates clearly that the duration of disability bears little relation to the presence of fracture.

These tables indicate that, though head injury may cause permanent damage to the brain and, in some, symptoms of varying degree, these disabilities should only rarely prevent resumption of manual work within 2 to 6 months of the injury. Reduction of efficiency is common after severe injuries, but is rarely sufficient to cause much disability. It is obvious, therefore, that far from being pessimistic regarding the prognosis after head injury, we can usually be confidently optimistic. The importance of expressing this optimism during treatment will be stressed.

I shall not here refer to the treatment of the acute stage. The recognition of complications in the early days, such as cerebral compression by haemorrhage, depends chiefly on the study of the temperature, pulse, blood pressure, and respiration, the degree of consciousness, and the development of abnormal neurological signs such as hemiplegia.

Meningitis is one of the most dreaded complications, but is often prevented by modern surgical treatment of wounds and by chemotherapy. All cases in which there is a persistent discharge of cerebrospinal fluid from the nose, however slight it may be, should be transferred promptly to a neurosurgeon so that he may close the meningeal fistula and thus prevent the dangerous complication of meningitis. The earliest signs of meningitis are a delayed rise of temperature, neck rigidity, and increased clouding of consciousness. An early increase in the white cell count in the cerebrospinal fluid provides the first evidence that this complication is developing. When the fluid is blood-stained both red and white cells must be counted to enable this pleocytosis to be recognized. Blood contamination of the cerebrospinal fluid will account for only one or two white cells per thousand red blood cells.

Complications which Often Cause Unnecessary Alarm

To those who are unfamiliar with the varied clinical course that may follow head injury it may be helpful to consider certain complications which sometimes cause needless anxiety and unnecessary operation.

An *epileptic fit* occurring during the first two or three weeks, whether local or general, does not indicate any serious complication unless it is followed by clinical evidence of further damage to the brain, such as hemiplegia; nor are these cases much more liable to develop traumatic epilepsy after recovery.

Delayed facial paralysis is common when there has been bleeding from the ear. The paralysis, which is usually complete, comes on within two or three days of the injury, and is probably due to some chemical change in blood clot in the facial canal. The paralysis should be treated as in Bell's palsy; recovery occurs usually in a few weeks, but sometimes by regeneration after several months (see below).

Neck rigidity is often thought to be due to meningitis, but is usually due to subarachnoid haemorrhage. Both these complications, however, may coexist; they can then only be clearly distinguished by counting the red and white cells in the cerebrospinal fluid as described above. Injuries to the cervical vertebrae are referred to later.

Bradycardia.—Abnormal slowing of the pulse often develops 2 to 4 days after severe closed head injury, and may continue for 2 weeks or more. During this period a pulse rate of 40 to 50 a minute is not uncommon. This complication need cause no anxiety, provided there is no associated deepening coma or other neurological evidence of progressive cerebral compression.

Papilloedema.—Contrary to much former teaching, increased intracranial pressure is seldom a dangerous complication in uncomplicated head injury. Papilloedema is not often present, but it occasionally develops to a slight degree 1 to 3 weeks after severe closed injury. This complication may occur without there being intracranial clot or other similar complication; apart from delaying convalescence, it is in itself of little importance.

Prolonged confusion or delirium is common after severe closed head injury and may continue for several weeks. This is not usually due to any vascular complication, such as cerebral oedema or compression by clot, but is apparently dependent on the nature of the original brain commotion. Careful nursing, with forced food and fluids if necessary, is the most important part of the treatment of these cases. Remarkably good mental recovery ultimately occurs in many severe cases, and a bad prognosis in this respect should not be given during the period of confusion. Sedatives should be avoided so far as is possible, as these delay mental recovery. Physical restraint should be minimal; after the early days a bath, sitting in a chair, or a walk along the ward will do no harm and often relieves restlessness.

Associated Injuries.—These may cause confusion in diagnosis and are easily overlooked. Injury to the cervical vertebrae sometimes results in weakness of the arms or legs which may be mistaken for cerebral paralysis. This injury causes a painful stiffness of the neck, movements of rotation being specially affected—unlike the stiffness due to subarachnoid haemorrhage or meningitis, which affects forward flexion of the head. Tearing of the brachial plexus may be a cause of paralysis, as also may fractures of the extremities or dislocation of joints; such paralysis is sometimes erroneously thought to be due to the brain injury.

Examination during Recovery.—Repeated examination during recovery should be made with a view to determining whether mental and physical functions are being restored. Regarding the intellectual functions, the unskilled observer is often misled by the patient's statement that he has quite recovered and by his apparently normal speech, when in fact he is still confused and disorientated. Disorientation for time and place is common, the patient often thinking that he is living in a period several years earlier. For example, a Polish airman seen recently after a crash was convinced that he was in Poland; he said the year was 1936, and that he had crashed in a German sports plane: he discussed intelligently the prospects of future war with Germany. As the intellectual functions recover, this long retrograde amnesia usually shrinks to a period of less than half an hour before the accident. Questions and discussion regarding recent world news will give a good idea regarding the state of intellectual recovery. Simple memory and calculation tests may also be used. When there is evidence of dysphasia this requires careful investigation.

Physical Examination

Physical neurological examination is necessary to detect damage to cranial nerves and brain. *Anosmia* is common in severe fractures of the anterior fossa and in occipital injuries (by contre-coup). This disability is usually permanent, and of course renders the soldier unable to detect many poisonous gases, including coal-gas. Damage to the *optic nerves* or *chiasma* is also usually permanent, and is recognized by loss of vision, by defects in the visual fields, and by pallor of the optic disks, which appears in about two weeks. Most *oculomotor palsies*, even when complete, recover well after a few weeks, but damage to the superior oblique muscle or its nerve may result in permanent diplopia. Ophthalmologists have recently discovered how to cure this disabling diplopia by operation.

Damage to the branches of the *trigeminal nerve* produces areas of anaesthesia over the face. This usually causes no disability, but sometimes leads to a troublesome form of neuralgia, which may be difficult to relieve even by operation on the nerve.

Peripheral *facial paralysis* associated with fracture of the base of the middle fossa may be immediate or delayed, as referred to above. Many of these cases recover completely in less than two months. Others recover gradually by regeneration over a period of up to 18 months; but this recovery may be incomplete, as in comparable cases of Bell's palsy. Recovery by a process of regeneration is recognized by faulty voluntary control of the facial muscles—attempts to move the upper facial muscles causing movements round the mouth, and vice versa. Complete failure of recovery after traumatic facial paralysis is extremely rare.

Fracture through the base of the middle fossa with haemorrhage into the middle-ear causes slight *middle-ear deafness* but no permanent disability. *Inner-ear deafness* is usually permanent, and occasionally becomes progressively worse. *Tinnitus*, often associated with inner-ear deafness, may be permanent, causing mental discomfort, which varies according to the loudness of the tinnitus and the patient's sensitivity to this irritating symptom; in many cases it occasions no disability and requires no treatment. *True vertigo* may also be troublesome.

Gross injury to the cerebral hemispheres, causing, in the acute stage, hemiplegia, astereognosis, homonymous hemianopia, or aphasia, often recovers well. Most of the possible recovery occurs within 3 months, and thereafter slight improvement continues for as long as 2 years.

Treatment during Recovery

In most cases of closed injury in young subjects a good recovery can be confidently predicted if the patient survives the first 24 hours. It is noteworthy, therefore, that within a short period of admission to hospital the atmosphere around the patient should change from one of anxious care to that of cheerful optimism. The second stage should be reached, if possible, before recovery of full consciousness. The patient's mental reaction to recovery of consciousness in bed, surrounded by dim lights and shadowy figures, with a splitting headache, confused thoughts, and complete amnesia for the reason of it all, may be almost catastrophic, and frequently sows the seed of a future anxiety neurosis. Medical and nursing personnel often aggravate this reaction by talking to him of severe concussion, fracture of the base, probable long incapacity, and possible after-effects. These sadistic activities must be rigorously suppressed. Nurses and relatives must be clearly told, whenever possible, that an excellent recovery is expected within a reasonable period. The patient's fears regarding his amnesia for the accident and its possible effects are relieved by simple explanation, and the expectation of good recovery is impressed on him. It is obvious that in cases with destructive lesions of the brain causing perhaps hemiplegia or aphasia the prognosis must be more guarded. It is important to remember, especially if there is a personal or family history of nervous instability, that head injury is one of the most common nuclei around which a patient will weave neurotic symptoms or exaggerations of slight bodily sensations. Careful convalescence and rehabilitation under intelligent and inter-

ested medical supervision have proved to be of the greatest value in ensuring the quickest and most complete recovery.

The period of rest in bed is the first point to consider. There are commonly applied rules for cases of fracture of the skull that are better discarded, as the radiograph gives little indication of the degree of brain damage. There is no need to keep a man who feels perfectly well after head injury lying in bed for 3 to 4 weeks just because the radiograph shows a slight fracture. His symptoms and clinical state provide the best basis on which to judge of the necessary period of rest.

In the average case the patient should be kept strictly in bed for about 7 days after full return of consciousness, or 5 days after relief from headache. Thereafter, allow him up for half to one hour more each day, according to the severity of the injury; slow down this process, or reverse it with a whole day in bed, if symptoms recur. After he has been up all day with little or no symptoms, start graduated physical exercises of a degree which causes little headache or dizziness, and work up gradually to the full exercises of the fit soldier. While little attention should be paid to slight headache or dizziness, medical supervision should be continued, as some patients require slower convalescence than others and some should not be expected to do the heaviest forms of P.T. in the early months following the injury. Some patients will require to be kept back, while others need encouragement. Under ideal conditions the same medical officer will supervise the case till the patient is fit to return to duty.

Prognosis

The prognosis and duration of treatment in all cases, whether acute or chronic, depend on three main factors: first, the severity of the injury, as indicated by the duration of amnesia and clinical evidence of brain damage; secondly, the age of the patient—if under 30 recovery is usually very good, it is slower between 30 and 40, and at over 40 it is often definitely slower and less complete; finally—and often the most important, as Symonds has stressed—the patient's previous personality and intelligence. The man with a good brain and personality recovers best; while the neurotic, the psychopathic personality, and the mentally dull often recover slowly and with many setbacks. An essential part of the investigation is therefore an inquiry into the soldier's previous intelligence, work and service record, tendency to neurosis, and family history.

An *approximate time-table* for closed head injuries with no complications or evidence of gross brain damage is as follows, severity of injury being roughly estimated by the duration of post-traumatic amnesia:

Slight cases—amnesia less than 2 hours—should be fit for full duty, category A, in 3 to 6 weeks. Delay for 2 to 4 weeks if fractures of skull are extensive or if symptoms are severe.

Moderate cases—amnesia of 2 to 48 hours—should be fit for full duty, category A or B, in 1 to 4 months, according to severity of post-concussional symptoms.

Severe cases—amnesia of over 2 days—should be fit for duty in category A, B, or C in 3 to 6 months.

This programme suits the average case of closed head injury, but a small proportion from all three groups will be permanently unfit for any form of service. The chief causes of permanent unfitness are:

1. *Physical destruction of brain tissue or of cranial nerves,* causing, for example, hemiplegia or hemianopia.

2. *Intellectual and Memory Impairment.*—This rarely occurs in young patients to an incapacitating degree, but is commonly severe in those over the age of 40 who have had very serious injuries. It produces considerable disability in N.C.O.s, especially if their previous intelligence was below the average. They are forgetful, are easily flustered, and quickly break down with anxiety, depression, and psychogenic headache. A slight degree of intellectual impairment often causes no noticeable disability to the private soldier, unless his previous intelligence was low. Transfer to the Pioneer Corps may sometimes be a satisfactory method of disposal. Intellectual impairment may result in a striking change of personality with behaviour disorder. This occurs most frequently in children and in adults of unstable personality. Soldiers of this type usually prove to be unfit for further service.

3. *Traumatic epilepsy* develops in about 3% of closed injuries, but in a much larger proportion after penetrating gunshot wounds. The fits usually develop 3 to 18 months after the injury; but the onset may be much later, especially after penetrating wounds.

4. *Organic Complications during Convalescence.*—Though the great majority of cases of head injury improve steadily and satisfactorily during convalescence, it must be remembered that chronic subdural and chronic extradural haemorrhage, delayed cerebral haemorrhage, arteriovenous aneurysm, cerebral abscess, and meningitis are occasional delayed complications. Abnormal drowsiness and other evidences of impaired cerebral function are important early signs of those complications, and call urgently for full investigation of the case, as prompt surgical treatment may be required.

5. *The Chronic Post-concussional Syndrome.*—This syndrome consists of symptoms such as headache, dizziness, nervousness, loss of concentration, and anxiety, which persist indefinitely after a head injury that is often slight. The headache is in many cases described as "terrible," is frequently continuous, and is not relieved by headache powders. The dizziness is seldom due to true vertigo, but is usually a feeling of light-headedness during which "things go black" and the patient requires to steady himself or to sit down for a few seconds to get relief. On careful analysis of the chronic cases it generally becomes apparent that the physical symptoms are slight but are grossly aggravated and exaggerated by psychological factors, of which, as a rule, anxiety is the most prominent—the patient having become "head-conscious," in the same way that the dyspeptic may become "stomach-conscious."

This troublesome syndrome can usually be prevented if convalescence and rehabilitation are organized and supervised as described above. The point to be emphasized is that though headache, dizziness, and nervous symptoms may persist as occasional post-concussional complaints for many months or even years, they cause negligible disability in the stable young soldier or airman.

The mental attitude of some Service patients to their injury corresponds to that observed in civilian compensation cases, and consequently the duration of disability is prolonged by the aggravating effect of anxiety neurosis or sometimes by deliberate exaggeration. In soldiers a fear of future head injury is a common cause for anxiety, and may develop, for example, when doing guard duties at night.

It is important to realize that graduated physical re-education will do these chronic cases no harm, and indeed has been proved to be the best treatment for the chronic headache and dizziness: it must, however, be combined with simple psychotherapy.

Psychoneurosis following head injury is more easily prevented than cured, especially when there is an element of malingering; but much can be done by explanation, encouragement, physical re-education, and discipline. For the difficult cases, duties should be chosen which suit individual temperament, interests, and capabilities. A feeling of discontent or a sense of grievance will greatly increase the difficulty of handling these cases.

Conclusion

It should be noted that modern treatment of head injuries aims at returning the soldier to duty sooner than some old traditions would allow. As has been pointed out, this programme is based on a study of the quick rate of recovery in patients of good type in whom there was no compensation or other factor which retarded progress. Experience has fully justified this aim, and has led to a considerable reduction in the period of disability. We have some failures, but even with these it is evident that vigorous methods of physical rehabilitation have at least done no harm.

In an experimental investigation into the effect of plasma transfusion on serum proteins, E. W. Shearburn (*Surg. Gynec. Obstet.*, 1942, **74**, 343) fed dogs with what was essentially a protein-free diet. On this diet the blood protein and blood volume decreased. A single transfusion of plasma calculated to restore the concentration of serum protein to animals proved ineffective, but the hypoproteinaemia was corrected by small plasma transfusions given once or twice daily.

CLOTHES AND FUEL SAVING

BY

Sir LEONARD HILL, LL.D., M.B., F.R.S.

If when France fell and her coal supply ceased our miners had all been kept in the pits and none enlisted, through foresight of future demands of new munition factories, no shortage of fuel would have resulted. The shortage has now come at a time when there is rationing of food, and particularly of fats, which have the highest heat-producing value, and of clothes by means of which body heat is conserved. If no fires are lit and people feel cold they can keep warm by greater activity, some 80% of the energy spent in muscular work appearing as heat. In consequence, however, there will be greater need of food, and if this is not available, loss of body weight. The alternative is to put on more clothes, and this is the most economical plan. Eskimos, Arctic travellers, and airmen keep warm by suitable garments enclosing all the body except the face in wind-proof manner. An Eskimo clad in furs will watch by a seal hole for hours, and even days, when there may be 50 degrees or more of frost and Arctic winds blow. Roman Catholic priests nurtured in Europe live in the far north in like manner with the Eskimos, whose diet of fat fish and seal meat and blubber is of high energy value. The greatest saving of fuel will be made if people will clothe themselves so that the temperature of factories and rooms can be kept at a lower level than usual. For those adequately clothed only enough artificial heat is needed to keep the hands warm enough for doing skilled work. To effect this great saving the clothing ordinarily worn out of doors for travelling can be brought into use, an overcoat, cloak, or raincoat being worn over the underclothes. The factory workers can wear their warmest underclothing under the trousered overalls supplied for their work.

Conservation of Body Heat

The northern Chinese withstand months of rigorous cold weather, using little fuel, by wearing long-sleeved wadded gowns, and wadded trousers bound round the ankles. The thin "undies" and skimpy dresses of women require warm rooms in winter; to save fuel they must be amplified as set out above. It is not the fibre of a garment which protects from heat loss, but the air which—a bad conductor of heat—is entangled in the woven mesh and between the layers of clothing. This air, if kept stationary in the meshes of the garments, becomes warmed up nearly to body temperature. Draught or wind must be prevented from blowing this air away, and replacing it continually by fresh cool air. A given volume of fur contains about 2% of solid and 98% of air, and an animal orientates to wind so as to keep its fur from being disordered. Fur and feathers have very great heat-retaining power combined with lightness and flexibility. The water bird by greasing its feathers keeps the water out. A penguin maintains a body temperature some degrees higher than ours when exposed to blizzards and 50 or more degrees of frost. Sedentary workers can keep warm at their desks, as they do when travelling in a car, by wearing an overcoat, a rug round the knees, and, if needed, a hot-water bottle at the feet. So protected, with no fire and window open, work can be done with improvement in health, as in the case of patients given open-air treatment.

While children taken from city tenements are benefited by exposure to open air and sun, this must not be beyond their power of assimilating food and increasing body heat production. Open-air workers suffer little from so-called "colds." These affections are spread by infection in shut-up artificially heated rooms. In sanatoria it is the nurses, who use such rooms when off duty, and not the patients exposed to open-air conditions, who catch "colds." "Colds" only affect Arctic settlements when ships visit them and bring in infection. It will be far better for health to wear more clothes than to cut down ventilation of factories in order to save fuel.

Protective Value of Fabrics

The heat capacity of water is more than 3,000 times, and its thermal conductivity at least 240 times, that of air. The cooling power of water is thus very great. The effect of cold wind is also great. The heat loss of a naked man in a room at 40° F., with the air moving at a rate of 6½ ft. per second, was twice as great as when clothed. The cooling power of the environment and the protective effect of clothes can be measured by the katathermometer—a large-bulbed spirit thermometer—which is warmed above 100° F., the time to cool from 100° to 95° F. being then taken with a stop-watch. Three knitted gloves put on the "kata" reduced the cooling power to about one-third of that of the naked instrument when suspended in air. The cooling power of water exerted on the naked "kata" was fourteen times that of air at the same temperature. If a thin rubber glove be put on over a thick woollen glove and the "kata" put in water its cooling is very greatly lessened compared with a naked "kata." The protection becomes considerably less when the under-glove is wet, but is still noteworthy, some air being entangled in the wet glove and evaporative loss impeded by the rubber glove. Wool is the best material to wear when clothes are wet, for it does not cling to the skin owing to its elastic fabric. Otherwise, so far as concerns warmth, it is the weaving and not the nature of the fibre which matters. Smooth-woven linings to coats increase their wind-proofness. Water-proofed garments are also wind-proof. Some years ago on inquiry of the Board of Trade concerning the maintenance of life in shipwrecked people, Argyll Campbell and I carried out tests on the heat loss of man when exposed to wind and splashing of waves, and found that a one-piece suit of water-proofed material, designed for them by Sir Robert Davis, lessened such loss by about one-half—that is, when worn over ordinary clothing.

I drew the attention of the Minister of Transport to this research, with the result that our merchant seamen are now all provided with a two-piece dress, designed by the Ministry, made of light oilskin material, and coloured yellow to be visible to air pilots. The dress packs into its hood and can be always carried in the same way as is a gas-mask. This dress adds greatly to their powers to resist exposure when the sailors, after wrecking of their ships, are in boats or on rafts. Given warmth and enough water to drink, they can survive with little or no food for many days.

Physiological Common Sense in Hot Climates

Black or dark garments are worn in cold climates, because the dark colour absorbs the radiant heat of sun and sky, while white is worn in the Tropics because it reflects much of the rays. The black skin of the negro, absorbing the rays, is excited to transpire water vapour and sweat; the glistening moist skin then reflects the rays. Protected by pigment the negro skin can be thin and heat loss is thus made easy from shaded parts. Convention should not keep white children clothed in the Tropics; they should go nearly naked and tan in the sun. Heatstroke is favoured by tight clothes, crowding, hot ground, high humidity of the air, and little wind. It results when the sweat glands cease to be effective, and can be warded off by a wet sheet placed over the patient and a fan set to blow on this and cause evaporative cooling. To secure efficiency of work in hot surroundings clothes must be mostly discarded, ventilation made adequate, and enough water for drinking supplied to keep up sweating. This is best slightly salted to balance the loss of salt in the sweat. The diet must be a light one so as to reduce heat production in the body.

At a quarterly court of the directors of the Society for Relief of Widows and Orphans of Medical Men, held on Oct. 7, the chairman, Dr. R. A. Young, senior vice-president, reported the death of the president, Mr. V. Warren Low, who had held office for thirteen years, and whose death will be a great loss to the society, as he had always taken the greatest interest in its work and was rarely absent from meetings. One new member was elected, and the audited accounts for the half-year ended June 30 were presented and approved. The receipts amounted to £3,611; the half-yearly grants to widows came to £1,937; and £2,090 had been invested in Defence and Saving Bonds. After being in abeyance for some years it was decided to make a Christmas present of £7 10s. this year to each widow in receipt of grants. Membership of the society is open to any registered medical man who, at the time of his election, is residing within a twenty-mile radius of Charing Cross. Relief is granted only to the widows and orphans of deceased members. Full particulars may be obtained from the Secretary, 11, Chandos Street, W.1.

Reports of Societies

STILLBIRTH AND NEONATAL MORTALITY

At a meeting of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine on Oct. 17, Dame LOUISE MCILROY presiding, a discussion took place on "Stillbirth and Neonatal Mortality."

Prof. D. BAIRD (Aberdeen) said that statistical analyses showed great differences in this mortality as between one country and another and between different areas of the same country. In 1936 in England and Wales 25,045 stillbirths and 18,200 neonatal deaths were recorded. It had been long recognized that infant mortality was largely dependent on poverty and low standard of living, and stillbirth and neonatal mortality rates might be similarly influenced. The exact cause of stillbirth was often difficult to determine, especially in domiciliary practice; and even in hospital, with the aid of routine post-mortem examinations, it was not easy. The appendix to the Registrar-General's report for Scotland (1937) classified 37% of stillbirths as of unknown or ill-defined causation, 14% as due to difficult labour, and 13% to foetal abnormalities. The speaker had attempted an analysis of cases in the only maternity hospital in his area, thus obtaining a cross-section of the stillbirth rate in Aberdeen during the period taken. The rate was 36 per 1,000. In 30 cases out of a total of 82 the cause was unknown, in 24 it was difficult labour, and in 9 toxaemia. Among emergency cases admitted to hospital difficult labour naturally entered largely, and, with placenta praevia, accounted for 50% of the cases.

The importance of neonatal mortality was evidenced by the fact that, in Scotland, 50% of the infant death rate related to the first month of life. In Scotland in 1937 the neonatal mortality was 38 per 1,000 births, in the North of England 34, in the South-East of England 24, while in large cities it varied from 43 in Glasgow to 24 in London. The London figure was about the same as for New York and Chicago, whereas Amsterdam had the low figure of 16. Among the booked hospital cases the biggest factor was infection. One of the chief problems was the prevention of prematurity. Many hospitals lacked provision for dealing with premature babies. Maternity hospitals should have special nurseries on the cubicle system for such infants. The incidence of premature labour in booked hospital cases, which represented the working-class community, was about 9%; among the middle and upper classes (in a series of 885 cases) it was 6%, and among booked specialist cases (330)—that is, patients coming in the early months of pregnancy, not because they were ill, but because they wanted to be under specialist care from the beginning—it was 2%. The neonatal mortality in these three groups was respectively 3.3, 1.35, and 0.6%. Stillbirth and neonatal mortality rates, as well as the infantile death rate, were higher in Scotland than in England, but 60 years ago the reverse was the case, and presumably there was no inherent weakness in Scottish offspring. In depressed areas measures to lower the mortality should take the form of better feeding of pregnant women and nursing mothers, intensive teaching of mothercraft during pregnancy, the provision of more antenatal beds for the treatment of complications, better postgraduate training of doctors and nurses, and better training of health visitors.

Paediatric Aspects

Prof. CHARLES MCNEIL (Edinburgh) said that the first month of life formed a bridge-head between obstetrics and paediatrics. He based his remarks on an analysis of 416 cases of stillbirth and, during the same period, 236 neonatal deaths. Post-mortem examinations had been carried out in 540 of these 650 cases. There was found to be a much higher incidence of congenital defects in premature children, so that congenital deformity was somehow linked with prematurity. Asphyxia had a prominent position in causes of death of both premature and immature infants, the anatomical explanation being that the infant's lungs were stiff and difficult to inflate. Paediatrics as a medical service, in contrast to obstetrics, was poorly equipped. There should be a strengthening of paediatric staffs in maternity hospitals. The diet of expectant mothers should also receive more attention. More needed to be learned about the first beginnings of the complicated process called digestion, which after birth was for the baby an entirely new mechanism. Measures should be taken to protect the baby in hospital from the great danger of infection, particularly from gastro-enteritis, which stood out easily first among infections as a cause of death. Every maternity hospital should have a follow-up clinic for its babies, and a much closer supervision of them during the first month of life, whether in hospital or out of it, especially as regards dietetics.

Dr. DOYNE BELL said that the treatment and prevention of immaturity—which he defined as some degree of unsuitability for extra-uterine life, as contrasted with prematurity, which denoted merely a time factor—were highly relevant to the present discussion. He criticized both the recent Toronto investigation which had been mentioned by Prof. Baird and that of the People's League of Health in London. In the former investigation the control series of patients was not strictly comparable with the subjects of the dietetic experiment, and the records of infant deaths were not stated in such a way as to permit of any valid conclusion being drawn. With regard to the latter investigation he gave reasons for thinking that the yardstick was not accurate enough to warrant the significance attached to the figures. An analysis of a series of unselected pregnancies showed that the range of error likely to occur in the estimation of the duration of gestation rendered conclusions based on the concept of prematurity highly unreliable. In spite of loose certification of neonatal deaths, both as to their exact cause and as to their exact age, it was probable that immaturity played an important part in their causation, but there was no reason at present to suppose that the problem of preventing immaturity had been solved. The prevention of neonatal death from immaturity could, however, be assisted by an adequate paediatric service. The maternity hospitals were not at present required by any Act or regulation to provide proper paediatric supervision of newborn infants.

Sir FRANCIS FREMANTLE, M.P., said that the neonatal mortality figures had improved slightly during the last three years, although infant mortality as a whole had risen, but not much, even on the very low figure for 1939. The increase and improvement of ante-natal clinics had taken place on a large scale. At the end of last year there were in England and Wales 1,600 of these under the aegis of local authorities and 260 under that of voluntary associations. The attendances last year were 452,000, and first visits paid by health visitors numbered over half a million. In all the surveys the general finding was that conditions of infant life were much more alarming when associated with poverty. But the economic conditions which created poverty were in some degree the result in present or previous generations of weakness of character or intelligence. It was not merely the social conditions which produced the statistics so much deplored; they were partly due to the fact that many of the people concerned were not able to look after themselves. Merely to improve the housing, necessary as that was, would not bring about the desired results. On the other hand, there were countless instances of people living in slums in the midst of penury who yet, because the mother was scrupulously clean and a good manager, brought up a healthy family. The problem must not just be left to Government provision, national or local, but the people themselves must be taught to use their own powers and intelligence.

The League of Health's Inquiry

Prof. JAMES YOUNG said that the report of the People's League of Health (*British Medical Journal*, July 18, 1942, p. 77) was probably the most comprehensive and best-controlled investigation ever carried out on this subject. It revealed two important results of statistical significance from the standpoint of the present discussion. The incidence of pregnancy toxaemia was about 30% less in women who received additional dietary supplements than in the control women, and toxaemia was known to be one of the chief factors in prematurity, stillbirth, and neonatal death. In the second place, the prematurity rate was about 17% less. The investigation could not be expected to reveal the full effect of the improved nutrition because in the majority of cases the women first entered the experiment

at a stage of pregnancy when the major risk of abortion had passed. The food supplements were given in the form of tablets and capsules, the only method by which such a large nutritional experiment was possible, and no doubt it was true that natural foods would be even more effective, so that the results, striking as they were, represented rather the minimal than the maximal influence of good nutrition. He added some up-to-date figures relating to changes in infant birth weights, prematurity rates, and toxaemia rates since the war began. The study had been carried out by Dr. Hargreaves at the British Postgraduate Medical School on "booked" cases during 1937 (1,597 cases), 1938 (1,765), 1940 (954), 1941 (846), and 1942 (662). The average birth weights of full-time children had shown a decline since the pre-war years from 7.3 to 7.1 lb. in primigravidae and from 7.6 to 7.4 lb. in multigravidae. The percentage prematurity rates had declined, though not so consistently, from 19.7 to 14.2 in primigravidae and from 16.7 to 13.6 in multigravidae. The percentage toxaemia rates had shown no consistent change.

Prof. Baird, in his reply, said that the appointment of paediatricians to emergency hospitals was desirable, but this would be only a wartime measure, and what he desired to see was appointments of the type recently made in Newcastle, where a doctor had been appointed "Professor of Child Health." He had been interested in Prof. Young's figures. The incidence of toxaemia in primigravidae in Aberdeen in booked cases was 8%, which was very close to the London figure, and he had always understood that there was relatively little toxaemia in maternity cases in London. In a small series of cases in private practice the toxaemia rate was only 3%, or less than half the hospital figure. The percentage prematurity rate in Aberdeen among hospital cases was 23, but in private practice only 8.

Correspondence

What is "Sterile Blood"?

Sir,—Recent contributors to the *Journal* have raised the above question and answered it to their seeming satisfaction, but not without leaving an opening for legitimate criticism. The question as to what constitutes "sterility" is evidently a matter of some perplexity. This is borne out by the report of four experts from the Blood Transfusion Service of the Medical Research Council as published in the *Journal* of March 21, 1942. These workers eventually decided that the ordinary bacteriological tests for the sterility of plasma were of little value, and they discarded them in favour of the naked eye as a check on their plasma storage technique.

Now the experienced bacteriologist may be able to say that cloudiness of plasma or serum means contamination and that clearness argues for probable sterility, but it is a departure from our usual scientific standards to dispense with proof of absolute sterility. It is quite obvious that in dealing with blood the bacteriologist is missing the free use of his autoclave, and that when he speaks of sterile blood he does not mean the same thing as when he refers to a sterile dressing. Everyone knows what is meant by the usual sterile fluids; they have been boiled or otherwise sterilized in order to kill off all forms of life within them. On the other hand, "sterile blood," although free from bacteria, is still a living tissue, but the activities of the living elements in stored blood have so far not had much consideration. There is in fact a widespread belief that the changes which take place in clean stored blood are purely physico-chemical, when as a matter of fact they must include the biological reactions of living things. It becomes necessary therefore to differentiate between those changes which are due to the inherent vital elements in blood and those which are due to contamination. Nor should we forget that the value of blood for many transfusion purposes is greatly diminished by the present storage processes, which aim at suppressing the extraneous forms of life but at the same time destroy the inherent vitality of the blood cells.

This vital aspect of blood was recognized by Crosbie and Scarborough,[1] who, among other criteria of the viability of the white blood corpuscles, described a curious "spinning" of the granules of the cytoplasm. This rapid oscillatory movement stops immediately when the cell is overheated—in short, when living protoplasm enters into its dead state. I have confirmed this observation, but I have gone further and found that, as the white cells break up, these spinning and, as I hold, living bodies can be seen floating free in the blood serum. With suitable technique, such as the use of dark-ground illumination under a high-power objective, it is also possible to demonstrate that there are other highly motile bodies in disintegrating "sterile blood."

We are faced then with the need for a more intensive investigation of the biological phenomena of stored blood which has been pronounced "sterile." It is clear also that the word "sterile" is not a suitable term in this connexion, because the state of sterility is inconsistent with the presence of vital elements in stored blood.—I am, etc.,

Medical School, University of Capetown. M. R. Drennan.

[1] *Edinb. med. J.*, 1940, **47**, 553.

Rehabilitation Centres

Sir,—I enclose a brief memorandum which expresses the general opinion of the members of the British Orthopaedic Association in regard to rehabilitation, and I am doing so at the request of some of the senior members of the Association. We feel that it should be clearly understood that the orthopaedic surgeons of the country are wholly in favour of this constructive medical and sociological movement.

I think we all feel that rehabilitation should begin very soon after the accident or wound, and be carried on throughout the patient's period in hospital in the form of occupational therapy and gymnastic or remedial exercises. There remains as a logical and very necessary development the organization of Rehabilitation Centres where the final and more concentrated stages of rehabilitation are given to enable the patient to be returned to the Services or to industry with the least possible delay.—I am, etc.,

G. R. Girdlestone,
Headington, Oxford. President of the British Orthopaedic Association.

*** The memorandum runs as follows:

The members of the British Orthopaedic Association recognize the value of measures already adopted by the Ministry of Health in introducing rehabilitation into E.M.S. orthopaedic, fracture, and accident services. They are not, however, satisfied that the later stages of rehabilitation have been adequately developed throughout the country; and for this particular purpose they urge the importance of establishing special Rehabilitation Centres, in association with existing orthopaedic, fracture, and accident services; under the same administrative and surgical control, but as a rule geographically separated in order to avoid the hospital atmosphere; and affording all facilities needed for the completion of treatment right up to the stage when work can be resumed. From undoubted evidence of grave wastage of man-power through accidents, they believe that the developments recommended are of immediate urgency in the prosecution of the war.

Listerism

Sir,—I have read the correspondence on the Lister technique in your issues of Sept. 5 and 26 and Oct. 3. A good case made out can't have too much backing, but there seems some confusion as to Listerism among others who think aseptic surgery is different from what Lister taught. The three main principles of Listerism are: (1) disinfection of the skin, (2) destruction or inhibition of the germs in the wound, and (3) prevention of the entrance of germs into the wound. Lister used antiseptics to produce asepsis, and he introduced dressings and a "protective" (oiled silk). We are indebted to him for the undermentioned: In 1866 he used crude creosote for wounds and banished pyaemia from his wards. He made a "plaster-of-Paris putty" for a compound fracture and covered it with tin foil, and so paved the way to the present-day method. (This was at a time when there was no bacteriology.) He tied the carotid artery of a horse under antiseptic conditions with good results, using first kangaroo tendon; this work then led him to chromic acid catgut. He invented a spray and this led to aerial disinfection. He taught the immobilization of wounds and fractures. He showed the possibilities of skin grafting. He insisted on sharp knives, so as not to bruise tissues. He showed the correct way of giving chloroform without a death. He introduced drainage of wounds. He was the

first to open a knee-joint under antiseptics. He introduced the gauze bandage and the double cyanide gauze—thus aimed at asepsis. He introduced "protective"—oiled silk coated with dextrine; it was soaked in boric solution. Here is added proof of his goal—asepsis. You can't have antiseptic treatment without simultaneous asepsis. He introduced boric ointment. He invented a sinus forceps. He introduced massage after fracture treatment. He insisted on instruments in trays being covered (asepsis). He first wired a fractured patella under antisepsis. He advocated the defensive power of human tissues.—I am, etc.,

Portsmouth. A. G. NEWELL.

Release of High-frequency Apparatus

SIR,—So much has been said of the hardship suffered by practitioners and patients from the impounding of diathermy and short-wave apparatus by the Post Office that I think it is only right, now that the restrictions have been modified, to put on record that my apparatuses have been returned to me with promptitude, efficiency, and in good working order. Although they have been stored for fully two years by the Post Office, it is pleasant to report that they have been extremely well cared for, and have come back in as good condition as they were in when they were taken away. The B.M.A. has been largely instrumental in securing this relaxation of the original order, and deserves the thanks of those who use high-frequency apparatus.

One further point I should like to mention. Although it has been considered necessary to retain screening restrictions, the Post Office have recognized the desirability of being able to treat cases without having to move them into screened cubicles. They have, in consequence, offered their technical help and collaboration in evolving an apparatus which would be free from the drawback of causing so much interference as the existing diathermy and short-wave apparatus and yet be sufficiently portable and robust that it could be taken to the bedside of patients. This would make it possible to treat cases of pneumonia, shock, and burns. Their help will be of the greatest practical value.

An experimental apparatus has already been constructed which, while itself not satisfactory, has shown the pitfalls to be avoided and also that the problem is one capable of solution. From the clinical and physical medicine point of view the use of short-wave currents in cases of shock is better than electric blankets, radiant heat cradles, and methods that have to rely on the conduction of heat from the skin. The Postmaster-General points out, however, that the supply of the necessary valves during the war may be extremely difficult. This would be overcome if, on clinical trial, the apparatus provided an improved method of combating shock.—I am, etc.,

C. B. HEALD.

London, W.1. Chairman, Physical Medicine Group, B.M.A.

Periodic Medical Examination

SIR,—It is to be hoped that the article on this subject by Dr. Frank Ellis (Sept. 26, p. 365) will arouse widespread interest. At the present time it is inevitable that experiments in preventive medicine should be side-tracked in favour of more urgent problems. The fact that the work of the Peckham Health Centre, which Dr. Ellis mentions, has had to be suspended must be considered perhaps a minor tragedy of the war. Nevertheless, those of us who have been inspired by the teachings of the late Sir James Mackenzie realize with Dr. Ellis that medical science can make little further progress without a better understanding of the early stages of disease. Further, we can only arrive at this understanding by reorganizing the medical services in such a manner as to permit of facilities for periodic medical examination of the whole population. Such facilities could be fitted without difficulty into most of the plans which have been elaborated recently.

The purpose of this letter is to point out certain difficulties and to make a concrete suggestion. Dr. Ellis mentions and discusses the work of the Life Extension Institute in New York. I was familiar with their published work, and also paid them a long visit in 1939. I was impressed by the efficiency of their organization, but I had two criticisms to make. (1) The Life Extension Institute were not able to persuade the American general practitioner to co-operate with them. In fact, the overwhelming majority of practitioners were not only non-cooperative but hostile. This is a cardinal fault in any organization which sets out to do systematic preventive medicine along the lines of periodic examination. As Sir James Mackenzie emphasized at St. Andrews, the general practitioner is the most important instrument in any such scheme. It is the general practitioner who is in closest contact with the patient, his family and background. (2) A more important criticism of the Life Extension Institute is a technical one. Their methods of physical and radiological examination of each patient were beyond criticism. They had also evolved a system of careful "history" taking, which represents a real advance. But physical and *x*-ray examinations of so-called healthy people are not sufficient. If we are to detect those functional abnormalities which inevitably precede disease—the stage of symptoms (or even earlier) rather than that of signs, as Sir James Mackenzie put it—we must have a new technique of examination. This, in my view, is where the Life Extension Institute fail. Their methods are admirably adapted to the detection of early disease, but that is not enough.

I have been engaged for many years in an attempt to devise and standardize a more sensitive and comprehensive technique for this sort of examination. The vast and fertile field of applied physiology and biochemistry is open to those of us who are doing this work. Now that this subject is arousing more general interest it is desirable that all who are actively engaged in this sort of research should combine and agree upon: (*a*) A standardized technique to be used for periodic examination. If we expect facilities we must be clear as to exactly what facilities should be provided. The correspondence in the same issue of the *Journal* on the subject of methods for the determination of blood sedimentation rate is sufficient proof, if such were needed, of the desirability of standardization. (*b*) A method of approach to the general practitioner. The best method of enlisting the support of the practitioner would be to enrol him inside the framework of any such preventive organization. In the meantime articles and books should be written setting out what knowledge we have and the manner in which such knowledge, applied to practical problems, could be of invaluable assistance to every practitioner.

Finally, a suggestion. Could not a committee or subcommittee be set up for this purpose within one of the planning organizations? In peacetime this committee could be expanded to form a society which should bear the name of Sir James Mackenzie.—I am, etc.,

London, E.C.1. E. OBERMER.

"Constipation" in Breast-fed Babies

SIR,—Dr. E. F. Chapman (Oct. 3, p. 408) pertinently alludes to a principle of wide application—viz., a child should be allowed to perform its functions of intake and output with the minimum of interference. The process of "training" as to times for feeds and as to times, places, and occasions for actions of the bowel is not merely unwelcome to the natural constitution of the child, it is reacted to by many children with feelings of angry defiance, aggression, hate, and obstinacy. In her desire and anxiety to "train" her child as soon as possible, the mother, unknown to herself, may be "getting her own back" for similar interference in her forgotten childhood. Furthermore, the child has to suffer interference emanating from ignorant, alarming, and misguided ideas as to what constitutes "constipation." The child is constituted to anticipate a pleasurable satisfaction from release of tension in the rectum in accordance with the timing of its own feelings and experience, its timing being neither that of the clock nor of mother. It therefore resents any form of interference, most of all if thereby pain is substituted for pleasure, as is apt to accrue from administering purges, enemata, suppositories, and the like by anybody however wittingly well-intentioned. An enema is all too prone to become an enemy in the mind of a child, hence resistant anal spasm and more prolonged "constipation" can result, even from the very thought of one, or of its giver.

Those who are concerned with the psychogenesis of many undesirable and handicapping character traits and of many psychoneurotic symptoms are convinced of the close association between such traits and symptoms and interference with the child's natural pleasures of ingestion and of elimination by *force majeure*. An interesting example of the evil that mothers

do living after them has been observed by Dr. Joan Malleson in her paper, "Vaginismus: its Management and Psychogenesis" (Aug. 22, p. 213). Under the section "Aetiology," she produces convincing evidence of the close association of this distressing disorder with anal pain of childhood. Dr. Malleson's paper merits the attention of all those concerned in the "training" of children and gratitude for her original observation of yet another malady that, in some cases, is otherwise inexplicable than by unwarranted and cruel "training." We live and learn!—I am, etc.,

London, W.1. R. TRAVERS SMITH.

SIR,—Your correspondent Dr. E. F. Chapman (Oct. 3, p. 408) disagrees with Prof. Charles McNeil's remarks in his alphabet of breast-feeding on "one type of constipation." No experienced paediatrician, least of all Prof. McNeil, will disagree with Dr. Chapman's observation that "large numbers of perfectly healthy breast-fed babies will only have a bowel action every two, or three, or even four days . . . there is nothing whatever the matter with these babies, and they should be left alone. The regular daily habit will establish itself later on." Dr. Chapman infers, however, that he does not believe in anal spasm, and accuses Prof. McNeil of inventing "an imaginary pathology to explain a non-existent disease." There is no doubt that such a condition exists, and it accounts for a considerable minority of the cases of infrequent defaecation in breast-fed babies. In both the habitual type of infrequent defaecation and anal spasm the stools are normal in colour and consistence, but anal spasm is characterized by excessive straining at stool, with severe congestion of the face and tight spasm of the sphincter ani muscle, which can easily be distinguished by inserting the little finger.

It is important to differentiate these two causes of infrequent defaecation so that appropriate advice can be given to the anxious mother. In the habitual type I usually explain to the mother that the small amount of residue and the contentment which occur in breast-feeding account for the infrequency, and that daily motions will be resumed when a mixed diet is introduced, if not before. Such an explanation usually persuades mothers not to interfere with spontaneous bowel action and allays their anxiety. In cases of anal spasm I advise dilatation with the lubricated little finger daily for a few days and then less frequently. There is absolutely no indication for the administration of aperients in either condition, yet most mothers and many doctors give them freely and produce a needless disturbance of intestinal function.—I am, etc.,

Edinburgh. J. L. HENDERSON.

SIR,—I have read with interest Prof. McNeil's alphabet of breast-feeding (Sept. 5, p. 271), and as one who is nowadays almost solely interested in the psychological side of things, I am delighted that he—so distinguished a paediatrician—should stress the importance of breast-feeding for infants whenever possible. The evidence I have been able to collect in my work establishes beyond reasonable doubt the superiority of natural over artificial methods of feeding for the psychological well-being of both mother and child. There appears too often a tendency among doctors to wean children prematurely, even when such weaning does not appear to be absolutely imperative. Dr. Mathias (Oct. 17, p. 465) seems to imply this when he ends by saying: "If artificial feeding were such a second-rate thing, why are there not more miserable children in doctors' families?" Is he not coming near to a recognition of one of the basic factors behind melancholia?

Although Prof. McNeil recognizes the possibility of psychological faults in mother and baby as giving rise to difficulties, does he not run the risk of artificially inducing them by the treatment that he advocates for constipation in the infant? It is on this account that I am reluctant to accept unchallenged his dictum that when constipation arises in breast-fed babies it should be relieved by the repeated passage of the doctor's little finger into the baby's anal canal. I have believed that constipation arising in early life will right itself if left severely alone. Psychologically it seems to be established that for a child under 6 the less physical interference it has the better, and the less the chance of a breakdown later in life. Prof. McNeil seems to have overlooked the alarming fear and primitive hate that can be aroused and stored up in the mind of a small child and the distressing psychogenic repercussions that may ensue from anal interference, the more so because the child is too young to understand what is happening. In mental research work I have had the opportunity of treating certain obsessional and border-line cases over a considerable period, and I have found definite evidence that traumatic environmental factors in infancy have played an important part in their symptom formation and character traits in the adult, and certainly have influenced their adult behaviour.

In his article Prof. Charles McNeil does not appear to go with the psychologist in these respects. To my mind the procedure he advocates runs the risk of inducing certain undesirable characteristics to develop as the child grows up. Reaction formations are liable to set in, among them shyness, asocial tendencies, over-sensitivity to criticism or control, acquisitiveness, etc., and the "difficult" adult may eventuate. Such treatment may contribute towards changing a social being into an antisocial one, in accordance with how much or how little the child has registered the feeling of having been raped. He or she may well react to the intrusion into their private affairs or "house" of the doctor's finger (however well lubricated) by repaying the compliment and later developing habits of a retaliatory nature. They would then become the over-curious person—that "nosey Parker," always poking into other people's business—or even worse, the delinquent, who "takes it out" of society by breaking into other people's houses and stealing their goods.

There is a danger, too, of reinforcing an unconscious passive homosexual bias in the male or of setting up a vaginismus in the female. (Dr. Malleson has referred to such a contingency in her article published on Aug. 22.) Fear of loss of sphincter control is a very real thing to the small child, and this is temporarily at any rate increased, with its concomitant fear of dirtying. It seems to me that no treatment that savours of violation should be administered to the very young child unless such procedure be absolutely necessary for that child's physical health, and that this is so in the technique under discussion Prof. McNeil does not appear to have established.—I am, etc.,

London. A. CYRIL WILSON.

Breast-feeding

SIR,—Dr. J. Gordon Mathias (Oct. 17, p. 465) states that the feed "should not be a sensuous orgy for the infant and a sexual experience for the mother." The real question is not what a breast-feed should or should not be (according to Dr. Mathias) but what in fact it *is*, physiologically. As to whether it is a "sensuous orgy for the infant" we can infer from observation of the feeding infant; we have evidence that Nature intended it to be a "sexual experience," using the term broadly, for the mother, in the well-known relation between stimulation of the breast and the uterus.

If Nature intended woman to feed infants woman should be pronograde, he argues; are our simian relatives all pronograde? As to caloric feeding for the (mythical) "classical ten-pound infant," the fallacies of rigid adherence to caloric or other fixed systems in dealing with that most individual problem—infant feeding—are common knowledge. Dr. Mathias argues that if the doctor is of the opinion that "the baby and the mother would fare better on artificial feeding, he should be equally competent to advise," but earlier in his letter he says "doctors in general know so little about infant feeding." I am afraid one must endorse both of these statements!—I am, etc.,

Darwen. R. C. WEBSTER.

Correct Use of Sulphonamides for Gonorrhoea

SIR,—May I appeal, through your *Journal*, to all practitioners to help the campaign against venereal diseases by using sulphonamides for the treatment of gonorrhoea in such ways as are calculated to make the patients non-infectious as quickly as possible and to run the least possible risk of creating sulphonamide-resistant strains of gonococci. From all parts of the country complaints are being received in the Ministry of Health that many practitioners start treating for gonorrhoea without first taking specimens for confirmation of the diagnosis, and give sulphonamides in quite inadequate dosage. Failure to take specimens makes it very difficult, whenever the symptoms have not abated or elapsed, to decide if the original

infection was or was not gonococcal because gonococci may have been merely driven to ground by the remedy. Inadequate dosage may abate the symptoms without eradicating the infection; thus by creating in the patient's mind the impression that he is cured it conduces to the spread of the disease. The evidence that it is possible to create sulphonamide resistance in gonococci by underdosage is sufficiently strong to warrant every effort to avoid it, because the spread of such strains throughout the country would take our anti-gonorrhoeal measures back to the pre-sulphonamide era. A timid dosage with sulphapyridine may perhaps be understandable when the infection is not life-endangering and the patient is ambulatory, because of the toxic effects of this remedy, but there is no reason for it in the case of sulphathiazole, which is now available in sufficient amounts for the eradication of gonorrhoea from the community.

There is now good evidence that administration of 5 grammes of sulphathiazole on two successive days eradicates the disease, in males at least, in over 90% of cases, and four days' treatment on the same lines affords still better results; in neither case does such a dosage give rise to any undue proportion of toxic effects, provided that the patient is made to drink plenty of water during the period of the chemotherapy. It requires only slight imagination to see the possibilities of this treatment from the point of view of the public health, if only all members of the profession will collaborate in exploiting it properly.—I am, etc.,

Ministry of Health, S.W.1. L. W. HARRISON.

SIR,—In view of the great importance of the control of gonorrhoea among the civil population, especially in wartime, I should like to draw attention to one easily avoidable hindrance to attaining this end. I refer to the common and, to judge by this clinic, increasing custom of practitioners to give sulphapyridine (M & B 693) at sight in cases of urethritis. Not only is this done without any bacteriological confirmation of the diagnosis, but, what is even more serious, the doses and rate of administration of the drug—e.g., one tablet t.d.s. for perhaps ten days or more—are often almost perfectly calculated to produce a drug-resistant strain of organisms. Only after this regime has been continued for a week or two and has failed to clear up the discharge is the patient referred to a clinic, by which time, it will be agreed, both diagnosis and treatment have been rendered considerably more difficult than they need be.—I am, etc.,

Croydon V.D. Clinic. P. W. HAMOND.

First-aid Treatment for Fractured Spine

SIR,—The greater part of my time in the last 3 years has been taken up with teaching and examining in first aid and other subjects for the B.R.C.S. and Order of St. John and teaching the Home Guard first aid. I have been impressed with the difficulty the first-aid student often seems to have in following and grasping the essentials of the first-aid treatment of fracture of the spine. For some time past I have thought that the instruction on this subject should be simplified and standardized. I was therefore interested to read an article in *First Aid and the Medical Practitioner*, one of the *Practitioner* booklets, on "First Aid in Fractures," by H. Osmond Clarke, F.R.C.S., of Manchester, in which he writes as follows:

"Fractures of the spine at any level should be transported in the supine position on a hard flat stretcher, maintaining as far as possible the normal contour of the spine by inserting a small pillow or pad (e.g., a folded garment) beneath the lumbar and cervical spines. It is of the greatest importance that an individual with an injured spine should be lifted on to the stretcher with his back supported at several points. If the spine is allowed to sag excessively into hyperextension or hyperflexion, as may occur when a man is lifted by his shoulders and legs, irreparable damage may be done to the spinal cord. To summarize . . . *Spine.*—Lift the patient with his spine supported at numerous points on to a hard, flat stretcher with a pad behind the lumbar and cervical regions."

This teaching of Mr. Clarke's appeared to simplify very much the first-aid treatment of fracture or suspected fracture of the spine, and to obviate the difficult (for first-aiders) question of the location of the injury, the difficult method of turning the patient on his side, and the stretcher on its side, and placing the patient in the prone position on the stretcher, in the case of fracture or suspected fracture of the dorsal or lumbar region. As this matter is one of considerable importance, I wrote to my old friend Prof. Harry Platt and asked his opinion. He writes as follows:

"With regard to the first-aid teaching of the immediate handling of fractures of the spine, I think there is a tendency—and it is a laudable one—to simplify the instructions. The distinction between cervical injuries and those in the dorsal or lumbar region is well enough for the expert, but liable to be confusing to those untrained people who may be called upon to move the injured person. I myself, therefore, would agree with the teaching that all spinal injuries can be *safely* transported in the supine position, provided (i) the natural contour of the spine is maintained—e.g., by appropriate pillows; and (ii) no *flexion* movements—or, indeed, *extreme* hyperextension movements—are permitted during the lifting of the patient. I do not think this subject has been debated recently by orthopaedic surgeons, but most of them would be keen on having a simple standardized method laid down for the guidance of the non-expert. I think your scheme is sound."

The scheme to which Prof. Platt refers is one which I suggested should be used as a standardized treatment for all cases of fracture or suspected fracture of the spine at any level by all first-aiders as immediate treatment. In all cases where there is a history of accident or injury to the neck or backbone with pain and shock, even though there is no paralysis of arms and/or legs, treat as follows:

(i) Warn the patient not to try to move; (ii) keep him warm; (iii) send for the doctor, and if there is any chance of getting medical assistance in a very short time, *do nothing more* till the doctor comes; (iv) if there is no chance of getting medical assistance within a reasonably short space of time, and (v) if you have trained assistants with blankets, triangular bandages, and stretcher, (vi) proceed as follows: if the patient is found in any other position except on his back, with great care and all the assistance possible turn him gently on his back; (vii) tie the lower limbs together by applying broad triangular bandages round thighs and knees, and a figure-of-8 bandage round both feet and ankles; (viii) five broad triangular bandages are passed under the natural hollows of the body, so that they come to lie under his head, chest, hips, thighs, and calves; (ix) two strong poles are used and the bandages are looped or tied round the poles, and the patient is slowly and gently lifted on to the stretcher by two or, if possible, three assistants on each side; (x) the stretcher, which is hard and flat, is prepared by folding the blankets as in the Army method, with a small pad or cushion made out of folded garments placed on the stretcher behind the cervical and lumbar regions respectively.

It will be seen that this method incorporates the teaching of Prof. Platt and Mr. Osmond Clarke (to whom I am very grateful), together with other details already in use, and it is for the immediate first-aid treatment of fracture or suspected fracture of the spine at any level. I think not only orthopaedic surgeons but also teachers and students of first aid would welcome some such simplified standardized method of treatment.—I am, etc.,

J. L. MOIR, M.B., Ch.B.,
Lt.-Col., Zone Medical Adviser, Anglesey Home Guard;
County Medical and County Civil Defence Officer,
Anglesey Branch B.R.C.S.

Subcutaneous Ligature of Varicose Veins

SIR,—As the originator, to the best of my belief, of this method I should like to express my gratification that Major E. L. Farquharson (Oct. 17, p. 453) has found it useful.

Further experience has somewhat improved the original technique (*B.M.J.*, 1941, **1**, 626). I find Mr. Dickson Wright's method of introducing the stitch through a hypodermic needle rather easier than using a curved needle, and I have given up the standing position for the patient. If the position of the vein is marked on the skin with ink in the standing position it is quite easy to carry out subsequent manipulations while the patient lies down. I still use the intradermal wheals of novocain, which take very little more time, and certainly relieve the patient of some discomfort.

As regards the permanence of the method, I have had a recurrence in a case of ectasia which required Trendelenburg's operation, but my other cases are still satisfactory, after more than two years in some of them. Whatever theoretical objections may be raised, the fact remains that the method is successful and that no hospitalization is required while the patient is being treated, which would be impossible for injection

alone. Incidentally, several of these people who have been treated by subcutaneous ligature are among my most grateful patients.—I am, etc.,

Bradford. H. S. Russell, M.D.

Shock Treatment in Psychiatry

Sir,—I would like to comment on your leading article on shock treatment in psychiatry (Oct. 3, p. 397). While one must fully agree with the need for systematic and planned treatment in psychiatry and also regret the tendency to regard electro-convulsant therapy as a panacea, yet it would appear a mistake to consider insulin shock and electro-convulsant treatment as therapeutically discrete.

Your article makes the important point of the need for standards of diagnosis and prognosis; and surely it is here that the schizophrenias produce the most difficult problems. Most psychiatrists would agree that the term "schizophrenia" covers a group of more or less closely related syndromes, and the value of insulin may be found greater in the schizophrenia-like psychoses than in true dementia praecox, or possibly even the other way round. In the former group of psychoses we can certainly claim some striking results with electro-convulsant therapy. In this clinic, for example, we have seen the resolution of thought disorders, depersonalization, in fact every kind of schizophrenia-like symptom-complex.

We do not assert that electro-convulsant therapy should replace insulin, but I feel sure that the time has not yet come for any generalizations upon their respective merits. We should base our therapy on the most prolonged and careful observations, and to this end one must again reaffirm the need (expressed in your columns in 1940) for more clearly defined criteria in psychiatry.—I am, etc.,

Jonathan Gould, M.B., B.Sc.

Department of Psychological Medicine, St. Bartholomew's Hospital.

Prevention of Small-pox

Sir,—Now that the outbreak of major small-pox in Glasgow is at an end it is permissible to discuss the question of the measures taken to combat it, and, in particular, the effort made to secure the mass vaccination (or revaccination) of the entire population of the city. It will not be disputed that such a measure is a serious one to take from more than one point of view. Vaccination is a much more serious operation than, say, immunization against diphtheria. In the majority of cases it constitutes a definite interference with health, and, although this is usually only temporary, it often lasts for over a week, and occasionally for very much longer. It is often serious enough to necessitate absence from work for several days or a week, and it may affect working efficiency even though the individual continues at work. We are told that the total number of persons vaccinated in the Glasgow campaign was 378,000. It would be interesting to know (were the figures available) the total amount of time lost from work as a consequence, direct and indirect, of all this vaccination.

Moreover, a vaccination drive, such as must have been practised in Glasgow, inevitably gives rise to, or at least must have greatly intensified, public alarm and upset—i.e., "scare," a psychological condition scarcely conducive to maximum productive efficiency. Lastly, the great administrative effort required for a vaccination drive on this scale must, it is reasonable to suppose, have tended to divert effort from really important measures such as the effective following up and control of contacts.

If promiscuous mass vaccination of a community were really essential for controlling an outbreak of small-pox and preventing it becoming a serious menace, not only to the city in question but to the whole country, then the effort, costly though it be in the ways indicated, could doubtless be justified. But is it essential? Surely the evidence available from the behaviour of major small-pox in the past half-century is all against such an assumption. During this period the proportion of the population protected against small-pox by vaccination has continuously declined, until it is now only a minority, yet the disease has shown itself less and less able to establish itself in this country, although it has been introduced again and again, sometimes under conditions apparently very favourable for spread.

Take the case of Leicester, with which city I am best acquainted, having been M.O.H. there for over 30 years (1901 to 1935). During my term of office I had to deal with a number of outbreaks of major small-pox, but mass promiscuous vaccination of the population was never attempted, or indeed advocated. Yet the disease never got out of hand, still less was there any general conflagration—as had been so often prophesied—and this in spite of the fact that the general population was, for all practical purposes, entirely unprotected by vaccination. Thus, during the 50 years 1885 to 1934 the percentage of children vaccinated averaged only 8.5. During the same period the total deaths from small-pox numbered only 53 in an average population of, say, over 200,000. Other towns have had a similar if less striking experience. In view of this, what serious grounds are there for thinking that general vaccination of the population plays any important part, under modern conditions, in the effective control of small-pox?

To prevent possible misapprehension may I say that I have a profound belief in the utility of selected individual vaccination—e.g., in protecting sanitary and hospital staff, and (to a less extent) in protecting actual contacts.—I am, etc.,

Leicester. C. Killick Millard.

"Duodenal Ulcer Battalions"

Sir,—Large numbers, probably many thousands, of men suffering from duodenal ulcer (and allied conditions) are being discharged from the fighting Services. The majority of these individuals are the best type of fighting man—sthenic, energetic, vigorous, and of high courage; many are discharged against their wishes. Is there any insurmountable reason why their services should not be retained? Why not form battalions or even divisions of "duodenal ulcers"?

With collaboration between the Ministries of Health and Food and the medical branches of the Services provision for feeding and the treatment of large bodies of men should present no real difficulty. Indeed, it should be easier and more economical to cater for, say, a thousand men living together under strict discipline than for the same number scattered throughout the country in individual homes.

And what a field for research: an opportunity which is not available in peacetime! Few will claim that our present methods of treatment of duodenal ulcer are entirely satisfactory. Medical treatment is generally inadequate: the surgical operations in vogue are drastic and crude.—I am, etc.,

Dundee. F. R. Brown.

Interchangeable Shoes

Sir,—In the annotation on laterality dominance in Shakespeare (Oct. 10, p. 432) it is remarked that Dr. Johnson made the "surprising comment": "He that is frighted or hurried may put his hand into the wrong glove, but either shoe would equally admit either foot," and Sir Walter Raleigh inferred that Dr. Johnson possibly wore his boots indifferently, "either on either foot," and believed that other people did the same thing. Is it not possible that in Johnson's time boots and shoes were made for either foot indifferently?

Lord Cockburn, in *Memorials of His Time*, a classic volume dealing with life in Edinburgh, especially the life of the Bench and the Bar, in the beginning of the 19th century, describes his outfit when he was first sent to the Edinburgh High School in 1787. He was provided, among other garments, with "brown corduroy breeches, tied at the knees by a showy knot of brown cotton tape; worsted stockings in winter, blue cotton stockings in summer, and white cotton for dress; clumsy shoes made to be used on either foot, and each requiring to be used on alternate feet daily; brass or copper buckles."

Some square-toed shoes seen on statues and in portraits of the 16th and 17th centuries appear as if they could be worn on either foot as the wearer inclined. Long pointed shoes of a much earlier period, such as those worn by the Prior of Jorvaulx in *Ivanhoe*, were almost certainly interchangeable for the feet.—I am, etc.,

Glasgow. John Patrick.

The King has granted Dr. Harry Chapman Sinderson, C.M.G., M.V.O., O.B.E., Dean of and Professor of Medicine in the Royal College of Medicine of Iraq, authority to wear the Insignia of the Second Class of the Order of El Nahda conferred upon him by H.R.H. the Amir of Transjordan in recognition of valuable services.

Obituary

LEONARD KIDD, M.D.

The death has taken place at Enniskillen, Northern Ireland, of Dr. Leonard Kidd, who for forty years held the post of medical superintendent of Fermanagh County Hospital, and for thirty-six years was direct representative for Ireland on the General Medical Council. Dr. Kidd, who was in his eightieth year, had been ill for a long time.

He was a native of County Louth and spent his early youth in Armagh. At one time he was a master at Foyle College, where he taught classical and modern languages. He was a keen player of rugby football, and once played for Ireland. He received his medical training at Trinity College, Dublin, and at Edinburgh, qualifying L.R.C.P.&S.I. in 1887, and taking his Dublin medical degrees in the following year. After various nospital appointments he settled in practice in Enniskillen, where his "monument" is the county hospital which he served as medical superintendent for so many years with marked ability and devotion. He transformed the institution from a comparatively small, poorly equipped building for the aged and infirm into one of the most modern and best furnished hospitals in all Ireland. It was no longer necessary for patients, well-to-do or poor, to undertake the hundred miles' journey to Dublin to undergo an operation. A theatre was installed, trained nurses introduced, proper accommodation for nurses provided, and the progress went on until, just before his resignation in 1937, a new maternity ward and children's clinic were added. Dr. Kidd was also for forty years medical officer to Portora Royal School, and took a deep interest in the welfare of its boys, including its old boys. A portrait of him was unveiled in the hall of the school early during the present year. He was president of Enniskillen District Nursing Society, and the high state of efficiency of nursing in Fermanagh was due largely to his efforts. For a time he was a member of his urban district council, where he zealously advocated improved housing, water supply, and sanitation.

In medical politics he was a prominent figure. One of his ideals was a Ministry of Health for Northern Ireland, and he had many consultations with the Prime Minister, the late Viscount Craigavon, and the Ministry of Home Affairs on the subject, but his advocacy was unavailing. He became a member of the British Medical Association as long ago as 1889, and in 1906 he was a very acceptable president of the Ulster Branch. He had also been chairman of his own, Fermanagh, Division. When the Association visited Belfast in 1937 he acted as vice-president of the Section of Medical Sociology. He had also been president of the Irish Medical Association (now merged with the B.M.A. in the Irish Free State Medical Union). His long membership of the General Medical Council, from 1906 until quite recently, introduced him to prominent medical men in Great Britain, by whom he was greatly esteemed. In the war of 1914-18 he served in the R.A.M.C., holding the rank of major. A deserved honour which came to him a few years ago was his appointment as Deputy Lieutenant for his county.

LOUIS C. PARKES, M.D.

The death of Dr. Louis Coltman Parkes at the age of 84 will recall to senior members of the Public Health Service a man who in his day did notable work in sanitary science and was long known to students and practitioners as the author of a standard textbook on hygiene which passed through eight editions. From University College Hospital he graduated M.B.Lond. in 1880 and M.D. in 1882, and he was one of the first to take the D.P.H. For many years Dr. Louis Parkes was medical officer of health for Chelsea and consulting sanitary adviser to H.M. Board of Works, retiring from the service of the Metropolitan Borough of Chelsea in 1923; he was also honorary sanitarian to the East End Maternity Hospital. He had been vice-president of the Royal Sanitary Institute, and was a Foreign Associate Member of the Société Française d'Hygiène. He held office at three Annual Meetings of the British Medical Association—as honorary secretary of the Section of Public Medicine in 1890, vice-president in 1895, and president of the Section of Hygiene and Public Health in 1909. He was the originator and sole author of the early editions of *Hygiene and Public Health*; Prof. H. R. Kenwood joined him later as co-author of that work, and collaborated in 1929 with Prof. Harold Kerr in preparing the eighth edition. Dr. Parkes also wrote small books on *Infectious Diseases: Notification and Prevention* in 1893, on *Elements of Health* in 1895, and on *House Drainage, etc., in Relation to Health* in 1909. He edited the third edition of Corfield's *Treatment and Utilization of Sewage*. He died in retirement at Holmbury St. Mary, near Dorking, on Oct. 11.

Dr. Robert Applegarth Hendry died at Rugby on Aug. 13, and medicine was the poorer for the loss of a general practitioner and gynaecologist who overcame his own disabilities in so heroic a manner that his fellows and patients always looked to him as the leader of local medical thought. He was a sufferer from arthritis for many years, but this he never allowed to interfere with the needs of his patients. He was always the same kindly administrator to the sick and suffering, wherever or whenever he was called. I have watched him operate late at night, and his thoughtfulness towards the theatre staff was a model for any young surgeon. Whenever a meeting was held at which controversy might arise he was an automatic choice as chairman, so respected was he by his colleagues for scrupulous fairness and honesty of thought. His academic career was brilliant, and he took the gold medal at the M.D.Lond. examination in obstetrics and gynaecology in 1908. He then became demonstrator of obstetrics and gynaecology, subcurator of the obstetrical and gynaecological museum, and Ethel Boyce Fellow, University of Liverpool; and honorary assistant gynaecological surgeon, Hospital for Women and Liverpool Royal Infirmary. When the highest honours in his specialty appeared within his reach, illness snatched them from him, and in 1925 he gave up his work in Liverpool and entered general practice. His love for gynaecology was so strong that in 1936 he again took up hospital work, joining the honorary staff of the Hospital of St. Cross, Rugby. He was elected chairman of the Medical Board, was chairman of the Rugby Division of the B.M.A., and had held the chair of various other committees, including the local Rotary Club. Dr. Hendry leaves a widow and two sons. The elder, Capt. Preston Hendry, R.A.M.C., is on active service in the Middle East. Shortly before his death Dr. Hendry received the news that this son had been mentioned in dispatches.—P. T. D.

Universities and Colleges

UNIVERSITY OF OXFORD

Dr. Alexander M. Cooke, F.R.C.P., May Reader in Medicine, has been elected to a professorial fellowship at Merton College.

In Congregation on Oct. 20 a decree was passed establishing a professorship of social medicine. This gives effect to the decision announced in these columns on July 25 (p. 101) to establish at Oxford an Institute of Social Medicine and to appoint a professor to be in charge of it. The Nuffield Provincial Hospitals Trust will devote £10,000 a year for the next ten years for the purposes of the chair and the institute in which the professor will work.

UNIVERSITY OF CAMBRIDGE

Prof. H. R. Dean, M.D., Master of Trinity Hall, has been elected the representative of the University on the General Medical Council for the five years from Oct. 22, 1942.

The late Sir Joseph Larmor, F.R.S., has bequeathed to the University £2,000 to be devoted to providing medical and surgical assistance and sick nursing to junior members of the University.

At a Congregation held on Oct. 16 the following medical degrees were conferred by proxy:

M.B., B.Chir.—R. M. Emrys-Roberts, A. J. Rook, W. F. Felton, M. Koettlitz, J. B. Stanton, G. Wetherley-Mein, I. N. Darbyshire, M. M. Brown, K. H. Lim, W. P. U. Jackson, R. J. F. H. Pinsent.

M.B.—J. Mackellar.

Cecil Clifford Dobell, M.A., F.R.S., of Trinity College, protistologist to the Medical Research Council, has been approved for the degree of Doctor of Science.

UNIVERSITY OF SHEFFIELD

Drs. H. Le Brun and W. A. Harney have been appointed temporary demonstrators of anatomy. The University Council has accepted, with regret, the resignation of Mrs. M. G. Happey, M.B., of the post of assistant bacteriologist, and has accorded its thanks to Dr. Happey for her services.

QUEEN'S UNIVERSITY OF BELFAST

Dr. William Lyle, a medical graduate of Queen's University, Belfast, and County Director of the Red Cross in that city, has been returned unopposed as a representative of Queen's University in the Northern Ireland Parliament, to fill the vacancy caused by the death of Col. A. B. Mitchell, F.R.C.S.I.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

It is proposed to hold a meeting of Fellows and Members at the College in Lincoln's Inn Fields on Thursday, Nov. 19, at 2.30 p.m., when a report from the Council will be laid before the meeting.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the Royal College of Surgeons of Edinburgh, held on Oct. 21, with Mr. J. W. Struthers, President, in the chair, the following who passed the requisite examinations were admitted Fellows:

W. R. Black, D. G. W. Clyne, P. G. L. Essex-Lopresti, T. B. FitzGerald, R. A. Fleming, L. Gillis, E. Gledhill, J. E. V. Jones, A. N. Reid, E. L. Salingar, M. Sugar, H. Winter.

The Services

CASUALTIES IN THE MEDICAL SERVICES

In an Admiralty list of casualties in H.M. minesweeper *Leda*, published on Oct. 16, the name of Temp. Surg. Lieut. WILLIAM WILSON TENNANT, R.N.V.R., is included as "missing, presumed killed." He was born on May 21, 1909, and was educated at the University of Glasgow, where he graduated M.B., Ch.B. in 1940. He entered the R.N.V.R. soon after qualification.

Surg. Lieut.-Cmdr. MAURICE CAY, R.N., who is reported "missing, presumed killed" in Oct., was the son of the late Capt. Cay, R.N., and graduated M.B., Ch.B. at the University of Edinburgh in 1934. After holding the post of assistant medical officer at the Hope Hospital, Salford, he entered the Royal Navy in Jan., 1935, and was recently promoted. He leaves a widow.

Missing.—Lieut. P. T. Chopping, R.A.M.C., Capt. L. B. Gunn, R.A.M.C., Temp. Surg. Lieut. B. H. O'Neill, R.N.V.R., Surg. Lieut. J. G. Reed, R.N.V.R.

Medical Notes in Parliament

Nutrition Council

On Oct. 20 Sir E. GRAHAM-LITTLE asked whether the Parliamentary Secretary to the Ministry of Food would consider the desirability of setting up a Nutrition Council, consisting of clinicians, laboratory workers, and medical officers of health, as urged from many authoritative quarters. Mr. ERNEST BROWN, who replied, said: I have read with interest the expressions of opinion about possible developments in the realm of nutrition, and have had an opportunity of discussing them with my colleagues. Though the advocates of the establishment of a Nutrition Council appear to differ somewhat among themselves both about methods and objects, the main purposes which they appear to have in view are already secured by existing arrangements. Technical investigation and research are adequately provided for through the Medical Research Council, the Agricultural Research Council, and the Department of Scientific and Industrial Research. A great volume of work is continuously in progress under the auspices of these bodies, and the first-named comprises among its members and officers a number of scientists outside the medical profession, and from the outset much valuable research on nutritional problems has been conducted on its behalf. The application to current problems of the results of scientific investigation is primarily the responsibility of the Health Departments, to which the Ministry of Food and the Agricultural Departments look for guidance in nutritional matters when framing their programmes of production, import, and distribution of foodstuffs. Co-ordination of the policies of the various Ministries concerned is fully provided for by appropriate interdepartmental machinery. As regards the international aspects of the subject, the Allied Governments last year appointed an interallied committee to prepare estimates of post-war relief requirements, and I understand that this committee has already arranged for a subcommittee of Allied nutrition experts to examine the estimates from the nutritional standpoint.

Mass Radiography

Mr. ERNEST BROWN stated on Oct. 15 that production of the standard apparatus for mass radiography had not reached a stage at which its cost could be closely determined, but it was expected to be in the region of £1,500. Apparatus of this kind was not subject to purchase tax. It was not proposed to make special grants towards this particular item of cost to those county councils and county borough councils who would be concerned, but Exchequer assistance was given towards the cost of the treatment of tuberculosis.

Diphtheria

Replying on Oct. 15 to Mr. James Griffiths, Mr. BROWN said the number of cases of diphtheria notified during the first three quarters of this year was 29,939. This represented a decrease of about 6,500 on the corresponding period last year. The provisional mortality figures for the first half of 1942 showed a decrease of 0.8% on the corresponding figures for 1941.

Making Sea-water Drinkable

The Department of Scientific and Industrial Research has investigated on behalf of the Minister of War Transport various methods of converting sea-water into drinking-water, and the conclusion has been reached that the most suitable apparatus for use in a lifeboat would be a small still. Such a still must have a high standard of efficiency in view of the restricted space available for storage of fuel in lifeboats. Experimental stills have been made and are now under test.

The Glasgow Small-pox Outbreak

Mr. LEACH inquired on Oct. 14 whether the Glasgow sanitary authority had tried to ascertain the vaccinal condition of the electrical engineer who was found to be suffering from confluent small-pox when removed to hospital from a steamer at Glasgow on May 29. Mr. JOHNSTON said this patient had been too ill to be questioned and the vaccination marks, if any, could not be seen because of the rash. The patient's companions stated that he had never been vaccinated. Inquiries to his relatives would have been difficult because they were in Australia. Answering further questions on the same date, Mr. Johnston said that when the outbreak began revaccination was offered to all staffs likely to come into contact with small-pox. A medical officer was vaccinated on May 29 without success, after he had been in contact with infection on a ship. The shipping company was not responsible for notifying small-pox on this ship, as the ship's doctor had diagnosed the case as measles complicated with pneumonia. No blame attached to a ship doctor who made a mistaken diagnosis in good faith. The case was recognized as small-pox on admission to hospital.

Fees for Medical Certificates

On Oct. 20 Mr. MOLSON asked the Minister of Health whether he proposed to take powers to restrict the fees charged by doctors for certificates recommending extra diet or fuel on account of ill-health. Mr. BROWN replied in the negative, but said he understood that the B.M.A. had recommended practitioners to forgo any fees for certificates of this kind where they believed that hardship would result to the individual.

Prevention of Frost-bite in Seamen.—Full instructions have, Mr. NOEL BAKER announced on Oct. 14, been given by the Minister of War Transport to seamen for the prevention and treatment of frost-bite. Every man sailing in Arctic waters is provided with a rubberized protective suit to guard against exposure in lifeboat or raft. Oil is also provided for further protection and for massage. Other aspects of protection are under consideration.

HOSPITAL REGIONALIZATION IN LANCASHIRE

The Manchester Joint Hospitals Advisory Board, which represents the voluntary and municipal hospitals of Manchester, the University, the local Division of the British Medical Association, and the Local Medical and Panel Committee, has issued its fifth annual report, which covers the two years 1940-1. An account is given of the institution in Manchester of the blood transfusion service, whereby four hospitals are centres for the distribution of stored blood to fourteen. The service is under the general direction of the medical officer of health and the administration of a medical committee of which Dr. J. F. Wilkinson of the Royal Infirmary is chairman. The other matter dealt with in the report is an account of the events following the adoption of a resolution by the Board supporting the proposals of the Nuffield Provincial Hospitals Trust, but requesting the Trust to approve of the Board being accepted as responsible for the inauguration and formation of a properly constituted regional council for a wider area. These views were accepted by the Trust, and steps have been taken for extending the area of the Board by approaching adjacent hospital authorities. An invitation has been accepted by the hospital authorities of Salford and Stretford to become members of a reconstituted Joint Hospitals Board covering these two municipal areas as well as that of Manchester. The amendments to the constitution and functions of the Joint Board are being made.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* during the week there was a sharp rise in the incidence of the common infectious diseases of childhood. The notifications of measles, scarlet fever, diphtheria, and whooping-cough were 849, 190, 131, and 127 in excess of the previous week's totals.

The rise in the notifications of scarlet fever was fairly general, the biggest increases being in Lancashire 53 cases, Northumberland 38, and Middlesex 36. The incidence of whooping-cough was little changed in London and the southern section of the country, where there was a tendency towards a slight decline, and the increase was confined to the northern counties.

The large rise in diphtheria was contributed mainly by two counties—Lancashire, where the cases rose from 140 to 195, and Cheshire, with an increase from 39 to 78. The principal centres of infection in Lancashire were Liverpool C.B. 63, Manchester C.B. 26; and, in Cheshire, Ellesmere Port U.D., 28, had the largest number of cases.

The biggest rise in measles was in Yorks West Riding, where notifications went up from 332 to 1,123. There were 108 more cases in the C.B.s, 201 in the U.D.s, and 23 in the R.D.s, and the county contributed 24% of the total cases in England and Wales. The largest returns were those of Leeds C.B. 264, and Bradford C.B. 131. Other big increases were recorded in London and Wales, with 106 and 104 more than last week's totals. In London the rise was greatest in St. Pancras, with 49 more cases than the previous week. The chief centres of infection in Wales were Flint (Rhyl U.D. 22), Glamorgan (Cardiff C.B. 22), and Merionethshire (Ffestiniog U.D. 21).

In *Scotland* the chief feature of the returns was the rise in the notifications of measles from 185 to 303: the rise was confined to the counties of Lanark and Renfrew, with Lanark County 52, Glasgow Burgh 26, Greenoch Burgh 56, and Paisley Burgh 68. The only other outbreaks of note were in the cities of Aberdeen 33 and Dundee 31. Diphtheria has been slowly rising in incidence, and the 220 cases notified constituted the largest total during recent months, almost half of these cases, 99, being reported in Glasgow.

In *Eire* the incidence of acute poliomyelitis remained at a high level with 28 cases; they were scattered throughout the country and involved fifteen areas.

In *Northern Ireland* scarlet fever, with an increase from 34 to 60 cases, was the only disease to show any marked variation. One-half of the cases were recorded in Belfast.

Dysentery

The notifications of dysentery are still at a very high level, but there was a slight fall, 23, in the total. A new outbreak was reported from Devonshire, 26 cases occurring in Barnstaple M.B. Essex was the only one of the existing centres of infection where a considerable drop, from 33 to 4, took place. In Norfolk the cases rose from 13 to 18, involving five administrative areas, and in Yorks North Riding from 25 to 30 (notifications for the week under review in Middlesbrough C.B. 28). In Wales there was a rise in Glamorganshire, Cardiff C.B., from 30 to 36, and in Caernarvon, Conway M.B., a drop from 13 to 8. 16 cases were reported in London, and also in Southampton (Droxford R.D. 12).

Small-pox

Further cases and deaths have been reported from the outbreak at Methilhill, Fife. According to the daily press, up to Oct. 23 there have been 7 deaths and 21 cases in hospital; there were over 100 direct contacts.

In reply to questions in the Commons, Mr. Johnston, Secretary of State for Scotland, stated that the amount paid by the Glasgow Corporation for lymph used in the recent small-pox outbreak was £5,402, of which £1,075 was recoverable from the local authorities of adjoining areas. In addition lymph to the value of £6,000 was supplied by the Department of Health for Scotland. 358 doctors and 190 senior medical students received fees for vaccinations, the largest individual amount paid being £271 2s. 6d.

Returns for the Week Ending October 17

The returns of infectious diseases in England and Wales during the week included the following: scarlet fever 2,703, whooping-cough 907, diphtheria 971, measles 5,796, acute pneumonia 608, cerebrospinal fever 59, acute poliomyelitis 24, dysentery 165, paratyphoid 6, typhoid 6.

Dr. Edmond R. Long, professor of pathology and president of the American Association for the History of Medicine, and Dr. Henry E. Sigerist, director of the Institute of the History of Medicine at Johns Hopkins University, have been elected honorary members of the Society of the History of Medicine at Buenos Aires.

No. 40

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 10.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942					1941 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	57	5	17	1	—	109	5	34	3	5
Deaths		1	—				—	—		
Diphtheria	991	47	220	71	29	997	58	227	37	45
Deaths	12	—	3	2	—	26	3	3	1	1
Dysentery	209	16	45	—	—	108	9	175	—	—
Deaths				—	—			—	—	—
Encephalitis lethargica, acute	3	—	—		—	4	—	1	—	—
Deaths		—	—				—	—		
Erysipelas		—	63	11	2		—	59	9	1
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years				62						
Deaths	57	8	7	22	7	33	—	13	47	9
Measles	4,650	329	303	40	11	715	34	14	84	—
Deaths	8	—	1	—	—	—	—	—	—	—
Ophthalmia neonatorum	104	6	28	3	—	80	4	15	2	—
Deaths										
Paratyphoid fever	11	2	4			87	6	11		
Deaths	—	—	—		—	1	1			
Pneumonia, influenzal*	541	27	9	—	6	629	16	1	—	6
Deaths (from influenza)	12	—	1	—	1	14	21	1	—	6
Pneumonia, primary			160	9				141	8	
Deaths				9	7				4	—
Polio-encephalitis, acute	2	—				2	—			
Deaths										
Poliomyelitis, acute	23	—	2	28	—	31	1	6	5	2
Deaths		—	—				—	—		
Puerperal fever	—	1	8	4	—	2	2	18	1	—
Deaths		—					—			
Puerperal pyrexia	192	12	8		—	149	5	11		2
Deaths										
Relapsing fever	—	—			—	1	—			—
Deaths										
Scarlet fever	2,613	165	407	54	60	1,217	44	249	52	16
Deaths	1	—	2	—	—	1	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	6	—	3	7	5	34	5	4	7	—
Deaths	1	—	—	—	—	3	—	2	1	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	972	96	26	31	3	2,078	223	56	43	13
Deaths	6	3	3	3	—	11	—	3		
Deaths (0–1 year)	325	34	50	43	26	276	15	75	71	20
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,826	534	518	204	119	3,598	466	505	219	100
Annual death rate (per 1,000 persons living)			11·7	13·6	‡			11·0	14·5	‡
Live births	6,292	739	894	426	248	4,899	460	898	397	195
Annual rate per 1,000 persons living			18·5	28·4	‡			18·3	26·4	‡
Stillbirths	229	25	35			204	16	33		
Rate per 1,000 total births (including stillborn)			38					35		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

A meeting of the Manchester Medical Society will be held at the Medical School, University of Manchester, on Wednesday, Nov. 4, at 4 p.m., when Sir Charles Wilson, P.R.C.P., will deliver an address on "Morale in Leadership." All graduates and students of medicine are invited to attend.

Prof. W. V. Mayneord, D.Sc., will give a discourse on "The Measurement of Radiation for Medical Purposes" at the Royal Institution, 21, Albemarle Street, W., on Friday, Nov. 6, at 5 p.m.

A meeting of the main executive committee of the Medical Superintendents' Society will be held at Station Hotel, Derby, on Saturday, Nov. 7, at 11 a.m.

An appointments system for out-patients will be instituted at St. George's Hospital from Nov. 2. Private and panel doctors are asked to co-operate by telephoning to arrange appointments with the appointments clerk at the hospital (Sloane 7151).

The *Zentralblatt für Chirurgie* of July 4 is dedicated to Prof. Carl Henschen, director of the surgical clinic at Basle. The issue contains his portrait, a foreword by Prof. Sauerbruch, and several articles by his Swiss colleagues.

The *Yorkshire Post* announces that a gift of £50,000 is to be made to the General Infirmary at Leeds by Mr. Charles Brotherton to cover the cost of building and equipping the private patients' wing which was opened in November, 1940. This new benefaction will make available from the Infirmary's special appeal fund a similar sum for proceeding with other much-needed extensions and developments after the war. The private patients' wing gives accommodation for 90 patients, and 79 beds are now in commission.

Nursing mothers are to be allowed priority supplies of eggs for 12 instead of 6 months, but doctors need only issue an initial certificate at the time of birth, the local food office arranging the priority thereafter automatically.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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QUERIES AND ANSWERS

First-aid Treatment of Wounds

J. R. L. writes: I am lecturing to a St. John Ambulance class on first aid, and I have stressed the importance of antiseptic measures in dealing with such wounds as they may have to treat. It occurred to me to suggest that bad wounds might be well sprinkled with sulphanilamide. I will be much obliged by an authoritative opinion on the advisability of recommending such a procedure to first-aid workers.

Reconditioning of Corks

Dr. C. HEAP writes: It is grossly wasteful to throw away corks from returned empty medicine bottles. Boiling, though it sterilizes, produces a dirty-looking cork which I do not like to use. Can anyone tell me of a method of bleaching suitable for use in general practice?

LETTERS, NOTES, ETC.

Aid for the Women and Children of Abyssinia

In these days of so many deserving appeals to individual generosity it is often a help to be reminded of causes which, by their nature, can lay some claim to support from the medical profession. One such cause is that of the Ethiopian Women's Work Association, which was first started to provide medical supplies and comforts for the troops in Abyssinia, but which is now tackling the even more difficult task of social welfare work among the women and children of that country. The London office of the association has recently received an urgent request for a woman doctor and for a social welfare worker to go out to Abyssinia to open clinics for women and children in all parts of the country, and to organize homes for children who, through the war, have been separated from or lost their parents. For this a minimum of £3,000 is needed. £1,000 has been received as a result of a broadcast appeal in September, but the balance and more is needed at once if this humanitarian work is to proceed at all. It is hoped there will be a generous response to the appeal. Donations should be sent to Lady Barton, Hon. Treasurer, 19, Neville Street, London, S.W.7.

Treatment of Furunculosis

Dr. A. I. CEMACH writes from Capel Garmon, N. Wales: The type of "furunculosis" described by Dr. G. L. Davies (Sept. 19, p. 351) was well known to Austrian doctors in the last war. It was eventually overcome by a single treatment which proved to be as specific as SUP 36 in Dr. Davies's case. A 15% solution of formaldehyde was applied locally to the initial papule and its surroundings as early as possible and repeated once or twice a day, with slight covering of the lesion to prevent chafing. As a rule the papule was arrested by this and dried up within a couple of days, no further crops appearing after two or three lesions had been checked in that way.

Naphthalene in Bedrooms

Dr. E. B. HAZLETON (Torquay) writes: It is not generally known that the vapour from naphthalene as used in bedrooms with the object of preventing the depredations of moths may be injurious to human beings. I have noticed the following symptoms: a feeling of weariness and lassitude in the morning with loss of appetite and a muddled head.

MEDICINE 100 YEARS AGO

Extract from a letter from John Barrett to the *Provincial Medical Journal*, published on October 29, 1842:

"Gentlemen,—If we may judge from some late communications to your Journal and the 'Medical Gazette,' the *questio vexata* of what is Asiatic cholera has yet to be solved. Thus, we have on the one side two cases of Asiatic cholera forwarded you by Mr. West, of Poole, and one to the 'Medical Gazette,' by Dr. Ayres, of Thame ('Medical Gazette,' Sept. 30), whilst on the other we have Mr. Salter, a gentleman of thirty years' experience in the locality of Mr. West's cases, giving us an article on the 'Diagnosis of Asiatic and English Cholera,' in which, though he courteously disclaims any 'desire to impugn the correctness of your very respectable correspondent's observations,' he urges the importance of correct diagnosis, and in the latter part of his article remarks with respect to what he terms the 'genuine oriental cholera.' 'In the first case that came under my observation, I felt that I was in the presence of a new disease, and that what I then witnessed I had never before seen; and I have no hesitation in saying that, since the disappearance of that epidemic, nothing resembling it has crossed my path.' There can be no misunderstanding this; he considers Asiatic cholera, if cholera at all, to be a cholera sui generis, whilst the communications of Mr. West and Dr. Ayres would lead us to the conclusion that they consider 'the Asiatic cholera itself,' to quote the words of Dr. Ayres, 'may be nothing more than an aggravated form of the disease so long familiar to us.'

"On which side does truth rest? No doubt, if we consider the intensity of the cholera such as it appeared in 1831-2-3, it was a new disease; at least, for my own part, I have seen nothing approaching to it in this respect, and there were circumstances attending it which I have never met with except then—e.g., the *intense* blueness, and, if the expression be allowable, the more deadly coldness of the body during life, with the singular return of warmth and natural color after death; the insusceptibility to blisters and sinapisms at the commencement, and the occurrence of vesication some days after at the parts where they had been applied; and lastly, the much talked of post-mortem muscular action—circumstances which, no doubt, were witnessed by most medical men conversant with cholera at the period in question.

"Few of your readers will, I think, dissent from Mr. Salter's opinion that rice-water evacuations, spasmodic tension of the muscles, and the blue skin cannot be considered pathognomonic of Asiatic cholera; and I must add, that whilst I allow that cholera cases do not now (at least under my observation) present us with any approach to the intensity of what was termed Asiatic cholera, yet in a modified degree they exhibit most of the symptoms mentioned by Mr. Salter as 'the symptoms belonging to the early stage of Indian cholera most to be relied upon'—viz., 'a remarkable shrinking or shrivelling up of the person, and especially of the hands, fingers, and tongue, with cold breath, and squeaking, indistinct voice, scarcely to be heard,' or, as Dr. Barry has described it, 'the low whine like that of a dog dying from arsenic.' Several of these symptoms I have seen in the cholera of this season."